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METEOROLOGICAL ABSTRACTS AND BIBLIOGRAPHY

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B. Bibliographic references to other items of interest to the profession.

C. Selective, annotated bibliographies on subjects of immediate and special interest to meteorologists.

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METEOROLOGICAL ABSTRACTS AND BIBLIOGRAPHY

MALCOLM RIGBY, Editor

Vol. 1 OCTOBER 1950 No. 10

SPECIAL FEATURE IN THIS ISSUE

A Selective Annotated Bibliography on Acoustical Propagation

(*For complete table of contents see back cover*)

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FOREWORD

Each issue of Meteorological Abstracts and Bibliography consists of four parts, as ca be seen in the table of contents on the back cover.

Part I comprises 100 to 200 classified and annotated references to current material in th field of *Meteorology* and other fields immediately applicable to *Meteorology*.

In addition, the first issue (Vol. 1, No. 1) contained a **Review of 30 Current Meteorologica Periodicals,** and the second issue a **Review of 15 Meteorological Periodicals which have lapsec**

Part II of each issue provides a means of accumulating the important references on give subjects without respect to recency. It is impossible to make these bibliographies exhaustiv under present personnel, time and printing limitations; but every attempt is made to include representative cross section of the various aspects of each subject, some preference being give to recent material, comprehensive works, those from obscure sources and those with goo bibliographies.

Selective, annotated bibliographies consisting of from 50 to 300 items each, have bee printed in the issues of Meteorological Abstracts and Bibliography, as follows:

(1) **Atmospheric Pollution,** Vol. 1, No. 1, Jan. 1950
(2) **Aerobiology,** Vol. 1, No. 2, Feb. 1950
(3) **Cloud Physics and "Rain Making,"** Vol. 1, No. 3, March 1950
(4) **Hail,** Vol. 1, No. 4, April 1950
(5) **Tornadoes,** Vol. 1, No. 5, May 1950
(6) **Volcanic Dust,** Vol. 1, No. 6, June 1950
(7) **Climatic Changes,** Vol. 1, No. 7, July 1950
(8) **Thunderstorms,** Vol. 1, No. 8, August 1950
(9) **Icing,** Vol. 1, No. 9, September 1950
(10) **Acoustical Propagation,** Vol. 1, No. 10, October 1950

Future issues will contain:

(11) **Evaporation,** Vol. 1, No. 11, November 1950

In Part III the contents of those journals which are primarily meteorological are list and published in the earliest issue where space permits. These entries are not classified indexed.

Part IV consists of author, subject and geographical indexes. The subject and ge graphical indexes are made up, as a rule, from the subject headings which follow each entr

In the June and December issues *cumulative* author and subject indexes will be publishe

LIST OF PERIODICALS

Note: In this list the preferred form of title for entry is given in bold face type. If the title is distinctive, the name and headquarters of the issuing society or organization follows the title. If the title is not distinctive the issuing organization precedes and is part of the title.

PERIODICALS IN WHICH METEOROLOGICAL ARTICLES REGULARLY APPEAR

Akademiia Nauk, SSSR, Izvestiia, Ser. Geogr. i Geofiz., [Moscow].
American Geophysical Union, Transactions, National Research Council, Washington.
★**American Meteorological Society, Bulletin,** [Boston].
★**Annalen der Meteorologie,** Meteorologisches Amt für Nordwestdeutschland, Hamburg.
Annali di Geofisica, Istituto Nazionale di Geofisica, [Rome].
Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. A and Ser. B, [Vienna].
Ciel et Terre, Société Belge d'Astronomie, de Météorologie et de Physique du Globe. Uccle-Bruxelles.
Geofisica Pura e Applicata, Istituto Geofisica Italiano, [Milan].
Geophysical Magazine, [Central Meteorological Observatory, Toyko].
Hemel en Dampkring, Nederlandse Vereniging voor Weer- en Sterrenkunde, [The Hague].
★**Idöjárás,** Az Országos Meteorológiai és Földmágnességi Intézet, [Budapest].
★**Indian Journal of Meteorology and Geophysics,** [Delhi].
Journal of Geophysical Research (formerly Terrestrial Magnetism and Atmospheric Electricity), [Washington].
★**Journal of Meteorology,** American Meteorological Society, [Boston].
★**Journal Scientifique de la Météorologie,** Société Météorologique de France, [Paris].
★**The Marine Observer,** Air Ministry, Meteorological Office, London.
★**The Meteorological Magazine,** Air Ministry, Meteorological Office, London.
★**Meteorological Society of Japan, Journal,** Second Series, Kisho Shushi, [Tokyo].
★**Meteorologické Zprávy,** Státní Meteorologický ústav v Praze, [Prague].
★**La Météorologie,** Société Météorologique de France, [Paris].
★**Meteorologische Rundschau,** Bad-Kissingen, [U. S. Zone, Germany].
★**Monthly Weather Review,** U. S. Weather Bureau, Washington, D. C.
★**Nimbus,** Sociedad Meteorológica de Bolivia, [La Paz].
Polarforschung, Archiv für Polarforschung in Kiel, [Kiel, British Zone, Germany].
★**Revista Meteorológica,** Junta Nacional de Meteorología, Montevideo.
★**Rivista di Meteorologia Aeronautica,** Associazione Culturale Aeronautica, [Rome].
★**Royal Meteorological Society, Quarterly Journal,** [London].
★**Tellus,** Svenska Geofysiska Föreningen, Stockholm.
Vsesoiuznoe Geograficheskoe Obshchestvo, SSSR, Izvestiia, [Moscow-Leningrad].
★**Weather,** Royal Meteorological Society, [London].
★**Weather Development and Research Bulletin,** Australia, Meteorological Branch, [Melbourne].
★**Weatherwise,** Amateur Weathermen of America, Philadelphia.
★**Wetter und Klima,** Deutscher Meteorologischer Dienst im Französischen Besatzungsgebiet, Seelbach b. Lahr/Baden, [French Zone, Germany].
★**Wetter und Leben,** Österreichische Gesellschaft für Meteorologie, [Vienna].
★**Zeitschrift für Meteorologie,** Meteorologisches Observatorium, Potsdam, [U. S. S. R. Zone, Germany].

★ Indicates those periodicals which are primarily meteorological.

EXPLANATIONS

Location of material: While it is physically impossible to give for each entry the name of ever library where that item might be obtained, it is possible, by using standard library symbols, to giv the reader some idea of where he might obtain such material. So in most instances a symbol take from the Union List of Serials (Gregory), or the Union Catalogue of the Library of Congress will b given just before the text of each abstract. In some cases where no symbol has been assigned t a library, one will be invented by using the general principle of the Union Catalogue list. As a ru the library indicated will be in the District of Columbia, with an occasional reference to one in Ne York or Boston. It will be noted that D stands for District of Columbia, M for Massachusetts an N for New York. Thus **DWB** stands for the U. S. Weather Bureau Library in Washington, D. C and **MH–BH** for the Blue Hill branch of the Harvard Library in Boston, Mass. In the latter cas since the Blue Hill Observatory contains not only the Harvard Observatory Library but that of th American Meteorological Society, the same symbol (**MH–BH**) will stand for either or both librarie

Library symbols: The following abbreviations have been used for Libraries in which the specif material thus indicated in this issue is located:

DA:	U. S. Department of Agriculture Library, Washington, D. C.
DBS:	U. S. Bureau of Standards Library, Washington, D. C.
DGS:	U. S. Geological Survey Library, Washington, D. C.
DLC:	Library of Congress, Washington, D. C.
DSI:	Smithsonian Institution Library, Washington, D. C.
DWB:	U. S. Weather Bureau Library, Washington, D. C.
MH:	Harvard University Library, Cambribge, Mass.
MH–BH:	Harvard University, Blue Hill Observatory (and American Meteorological Society Library, Milton, Mass.

Geographical (place) names are in the form generally used internationally, rather than in the for used locally. For instance Vienna is used instead of Wien, Florence for Firenza, Moscow for Moskv and Germany for Deutschland, etc.

Titles of articles or monographs are in the language of the original article unless otherwise state Slavic (Cyrillic) titles are transliterated according to the Library of Congress transliteration schem into the Roman Alphabet.

Entries for **titles of periodicals** are given in the form used on the title page of the periodical providin the title is distinctive (Monthly Weather Review, Meteorologické Zprávy, and Revista Meteo ológica). If the journal is the official organ of a society or institution and the title is not distinctiv as is the case with Transactions, Bulletins, Proceedings, Comptes Rendus, Trudy, Izvestiia, Sitzung berichte, Verhandelingen, Miscellanées, etc., the preferred name of the organization is given firs as part of the title (American Geophysical Union, Transactions; Royal Society of London, Pr ceedings).

Abbreviations and other symbols:

Titles of periodicals are not abbreviated as a rule. Other abbreviations will be used sparingl and only when the abbreviation is obvious.

The months of the year from March through July are not abbreviated. Other months a abbreviated as Jan., Feb., Aug., Sept., Oct., Nov., and Dec., respectively.

The word or abbreviation for Volume, (Tom, Band, Jahrgang, Año, etc.) and for Numb (Heft, Fascicule, Vypusk) and page or pages is omitted from most entries. Thus an entry will rea as follows:

Meteorologische Rundschau 2(5/6):146–151, May/June 1949.

This indicates that the article was in the Meteorologische Rundschau, Jahrgang 2 (Vol. 2 Heft 5/6 (No. 5 and 6), pages 146–151, Mai/Juni 1949.

The symbol * before an entry indicates a good data source.

The symbol † before an entry indicates a good bibliography source.

The symbol § indicates a synoptic case history study accompanied by charts.

PART I. ABSTRACTS OF CURRENT METEOROLOGICAL MATERIAL

GENERAL METEOROLOGY

10–1 551.5(02)

§Schütt, K., **Einführung in die Meteorologie auf physikalischer Grundlage.** [Introduction to meteorology based on physical principles.] Berlin, Palmen-Verlag, **1950.** 179 p. 86 figs., tables. **MH-BH**—In this textbook the author makes a thorough survey of the field of synoptic and dynamic meteorology on a physical or empirical rather than a geographical (on the one hand) or mathematical (on the other) basis. The text is supported by numerous original and some classic schematic diagrams and representative synoptic charts. After an introduction on the relation between the thickness and composition of the atmosphere and radiative processes which affect the atmosphere, the book contains chapters on the various weather elements (temperature, pressure, humidity, clouds, precipitation, wind and visibility), air masses which affect Europe, fronts, cyclones, anticyclones, effect of continent and ocean, and methods of synoptic analysis. Finally, the role of the stratosphere in global aviation is discussed. Several interesting and original experiments are described for illustrating the physical principles operating in meteorology. *Subject Headings:* **General meteorology, Textbooks.**—*M.R.*

10–2 551.5(09)

†Queney, Paul, **Rapport sur le développement de la météorologie dynamique aux États-Unis pendant la période 1937–1947.** [Report on the development of dynamic meteorology in the United States during the period 1937–1947.] *Annales de Géophysique,* 5(1):89–97, Jan. **1949.** 133 refs. **MH-BH**—This is a comprehensive review. The author lists the principal centers of meteorological research and serial publications in meteorology. The advances in dynamic meteorology are discussed under the following headings: general circulation, waves and atmospheric perturbations (large scale waves, cyclonic waves, tropical waves, relief waves) and thunderstorms. The bibliography lists general treatises, textbooks, manuals for forecasters and for aviators, and original articles. *Subject Headings:* **Dynamic meteorology, Progress in meteorology.**—*I.L.D.*

10–3 551.5:37

Butler, F. H. C., **Course in meteorology at Malham Tarn, 6–13 September 1950.** *Weather,* 5(6):208, June **1950.** photo. **DWB**—Description of a proposed holiday course in meteorology. *Subject Heading:* **Teaching of meteorology.**

10–4 551.5:52

Kuiper, Gerard P. (ed.), **The atmospheres of the earth and planets.** Chicago, University of Chicago Press, [**1949**]. 366 p. numerous figs., 16 plates, numerous tables, refs., equations. **DLC**—This monograph "covers only such aspects of the terrestrial atmosphere as lend themselves to a comparison with planetary atmospheres in general." Emphasis is placed "first, on spectroscopic and other optical methods and second, on the upper atmosphere, which is important for its photochemical processes affecting the composition, as well as the rate of escape, of planetary atmospheres." The ionosphere and related solar phenomena are not included explicitly. In the introductory chapter the editor summarizes the contents of the succeeding articles: namely, the general circulation of the lower atmosphere of the earth, scattering in the atmosphere of the earth and planets, spectroscopic studies of the night sky aurora of the solar system, the nature of the planetary atmospheres, the physical properties of the upper atmosphere, the formation of the earth's atmosphere, etc. The introduction is more simple and less technical than that of the individual contributions and includes some results of studies on the ionosphere and related solar phenomena not mentioned elsewhere. The articles listed below will be analyzed individually.

Rossby, Carl-Gustaf, **On the nature of the general circulation of the lower atmosphere.** 10–6
van de Hulst, H. C., **Scattering in the atmosphere of the earth and the planets.** 10–89.
The upper atmosphere studied from rockets;
Greenstein, Jesse L.: **A, Research programs.**
Clearman, H. E.: **B, The ultraviolet solar spectrum.**
Durand, E.: **C, Rocket sonde research at the Naval Research Laboratory.**
Whipple, Fred L., Jacchia, Luigi, and Kopal, Zdeněk: **Seasonal variations in the density of th upper atmosphere.**
Swings, P.:**The spectra of the night sky and the aurora.**
Spitzer, Lyman, Jr.: **The terrestrial atmosphere above 300 km.**
Chamberlin, Rollin T.: **Geological evidence on the evolution of the earth's atmosphere.**
Brown, Harrison: **Rare gases and the formation of the earth's atmosphere.**
Adel, Arthur: **Selected topics in the infrared spectroscopy of the solar system.**
Migeotte, M. V.: **On the presence of CH_4, N_2O, and NH_3 in the earth's atmosphere.**
Dunham, Theodore, Jr.: **Spectroscopic observations of the planets at Mount Wilson.**
Kuiper, Gerard P.: **Survey of planetary atmospheres.**
Herzberg, G.: **Laboratory absorption spectra obtained with long paths.**
Franck, James: **Possibility of photosynthesis on Mars.**

Subject Headings: **Planetary atmospheres, Upper air observations, Solar spectrum.**—*I.L.D.*

10–5 551.5:656.6(02

Burgess, C. R., **Meteorology for seamen.** Glasgow, Brown, Son and Ferguson, 1950 Price 15s. 252 p. illus. **MH-BH**—Pt. I. Factors which go to make up the weather (genera theory of meteorology). Pt. II. Climates of the oceans, including air masses. Pt. II Weather forecasting. Pt. IV. Observing and recording the weather. [From a review in th *Marine Observer*, original book unchecked.] *Subject Headings:* **Marine meteorology Textbooks.**

10–6 551.5:06(26

Great Britain. Meteorological Office, **Work of the year (ending 31st March, 1950) of th Marine Branch of the British Meteorological Office and the Voluntary Observing Flee** *Marine Observer*, 20(149):125–135, July **1950.** fig., 2 photos, 3 tables. **MH-BH**—Notes on voluntary observing ships, ocean weather ships, marine climatology, currents and ice, etc *Subject Headings:* **Meteorological services, Great Britain.**

10–7 551.5:656.

Satow, P. G., **Marine navigation; radar, meteorology and charts.** *Marine Observer* 20(149):158–167, July **1950.** 2 figs., photo. **MH-BH**—Includes notes on sub-refraction an super-refraction due to meteorological causes. *Subject Headings:* **Marine meteorology, Rada meteorology.**

10–8 551.5:778.

Farquaharson, J. S., **Meteorological films.** *Weather*, 5(8):295, Aug. **1950. MH-BH**— Gives preliminary catalogue of meteorological films and film strips available in England *Subject Heading:* **Meteorological films.**

10–9 551.5:06(09

Jurva, Risto, **Geofyysillisen Seuran perustamisesta ja tiominnasta vuosina 1926–1946** [The founding and activities of the Geophysical Society during the years 1926–1946.] *Geo physica, Helsinki*, 3:20–25, **1948. MH-BH**—An account of the activities of the Society and th most important persons who helped found and maintain it through the past quarter century Oscar Johansson, Väisälä, Palmén, Keränen, Korhonen, Renqvist, Rossi and many other well known meteorologists are among those given special mention. *Subject Headings:* **Geophysica Society of Finland, History, Finland.**

10–10 551.5:9

Glasspoole, J., [**Obituary**] **Hugh Robert Mill.** *Meteorological Magazine, London* 79(936):180–182, June **1950. DWB**—*Subject Headings:* **Hugh Robert Mill, Biography.**

METEOROLOGICAL OBSERVATIONS AND INSTRUMENTS

METHODS OF OBSERVATION

10–11 551.501:551.509

Ångström, Anders, **Den senaste utvecklingen av väderlekstjänstens tekniska hjälpmedel.** [Recent developments of technical facilities for weather service.] *Ymer, Stockholm*, 68(3):189–205, **1948.** 7 figs. **DLC**—An illustrated article (in Swedish) describing in considerable detail the new facilities that have been developed since the war for filling in the gaps in the weather map: the network of Ocean Weather Ships in the Atlantic; the use of radar to detect hurricanes, showers and thunderstorms that might develop or "slip through" between stations or weather ships; the weather flights made by the U. S. A. over the Pacific, the Caribbean, the Atlantic and Arctic (from Fairbanks to the Pole) to supply synoptic and aerological reports where no surface stations exist; thunderstorm and frontal detection by radiogoniometry or *sferics*; the use of radar to determine upper air winds and, finally, the new methods of synoptic analysis used by the Swedish Weather Service (use of pressure surface contours instead of isobars for upper air analysis). *Subject Headings:* **Progress in meteorology, Synoptic analysis, Sweden.**—*M.R.*

10–12 551.501.1(02)

U. S. Weather Bureau, **WBAN manual of surface observations; Circular N,** 6th ed. Washington, D. C., U. S. Government Printing Office, Jan. **1949.** 118 p. 10 figs., 37 tables. **DLC, DWB**—Manual prepared by U. S. Weather Bureau personnel in cooperation with U. S. Air Force and Navy representatives to secure uniformity in surface observations where possible, with separate addenda for each service to use where uniformity is not desirable. Includes sections on clouds, visibility, hydrometeors and unusual weather phenomena, precipitation, temperature, humidity, pressure, wind, etc. *Subject Headings:* **Instructions for observers, Manuals.**—*M.R.*

10–13 551.501.4:519.2

Couffignal, L., **La méthode de H. Labrouste pour la recherche des périodes.** [H. Labrouste's method for research on periodicities.] *Ciel et Terre*, 66(3–4):78–86, March–April **1950.** 6 figs., 13 refs., 3 equations. **DLC**—Mathematical and graphical exposition of a method of periodogram analysis (by means of linear combinations of ordinates or the superposition of sinusoidals). The system has been applied to studies of periodicities in seismology, terrestrial magnetism, hydrology and pluviometry. *Subject Headings:* **Harmonic analysis, Periodicities, Hydrometeorology.**—*M.R.*

10–14 551.501.4:551.513:551.509.33

Forsythe, George E., **Solution of the telegrapher's equation with boundary conditions on only one characteristic.** *U. S. National Bureau of Standards, Journal of Research*, 44(1):89–102, Jan. **1950.** 2 tables, 12 refs., 53 equations. **DLC**—The solution to the problem presented by Rossby, of forecasting of planetary flow under idealized conditions, is represented by Green's function. Method of computing tables described. Tables of Green's function for every 5° of longitude for 14 time values are given to 5 decimal places. *Subject Headings:* **Method of computation, Planetary circulation, Mathematical forecasting.**—*M.R.*

10–15 551.501.4:551.508.5

Lisitzin, Eugenie, **On the accuracy of wind observations made on board Finnish light-ships.** *Geophysica, Helsinki*, 3:138–145, **1948.** fig., table. **MH-BH**—The author discusses the effect of subjective judgments of observers upon the accuracy of wind estimates on the Beaufort scale. In order to obtain some idea of the possible deviations in the estimation of wind force by different observers, mean annual values have been calculated over a period of twenty years for nine lightships. The variations at each lightship are analyzed. The deviations increase as the turn over of the number of observers increases. The correlation between the different stations and the entire area may serve as a measure for the accuracy of the wind observations. *Subject Headings:* **Observational errors, Wind measurements, Finland.**—*I.L.D.*

10–16 551.501.45 551.583.1

Renqvist, Henrik, **Om väderlekslägets sekelsvängar och långdanser.** [Secular an periodic variations of the weather.] *Geophysica, Helsinki*, 3:13–19, 1948. **MH-BH**—Th author discusses critically the general belief that the world climate is becoming more moderat and the extent to which the variations of the weather are either periodic or aperiodic. *Subjec Heading:* **Climatic changes.**—*I.L.D.*

10–17 551.501.7:551.510.

Hinkelmann-Langensalza, K., **Verfahren zur Messung der Luftdichte in grossen Höhen mittels Vermessung von Fallkörperbahnen.** [Method for measuring air density at grea heights by observing trajectories of falling bodies.] *Zeitschrift für Meteorologie*, 3(10):297–304 Oct. 1949. fig., 16 equations. **DLC**—Author proposes that path and acceleration of a bod ejected from a projectile fired vertically into high stratosphere should be followed with two o three theodolites or by wireless echoes, and the density calculated. He calculates probabl error and argues that the method would be efficient. *Subject Headings:* **Upper air observations Atmospheric density.**—*C.E.P.B.*

10–18 551.501.81:551.515.

Jones, R. F[illegible], **Thunderstorm tracks by radar.** *Weather*, 5(6):224–225, June 1950. 1 photos. **DWB**—Ten photos of radar plan position indicator and two of vertical section during thunderstorms of 13 July 1949. *Subject Headings:* **Radar storm detection, Thunderstorm tracks.**

10–19 551.501.9:551.57

Ångström, Anders and Melin, Ragnar, **Sambandet mellan den meteorologiska och hydrologiska tjänsten i Sverige.** [Collaboration between the meteorological and hydrologica services in Sweden.] *Ymer, Stockholm*, 70(1):51–59, 1950. Summary in English p. 58–59 **DLC**—This article outlines the organization and functions of the various branches of th Swedish Meteorological and Hydrological Service and enumerates the advantages which hav been derived from the consolidation of the two services. Besides saving in administrativ costs, and the advantage of the use of a common library and workshops, the **hydrological servic** benefits by the use of the meteorological charts and forecasts, the rainfall observations an snow measurements, etc. The **meteorological service** benefits by the more intensive theoretica and practical treatment of precipitation, snow cover and evaporation, ice problems, etc., whic the hydrologists have made, and by constant consultation with the hydrologists. Suc collaboration has grown steadily from 1873 until 1919, when the two bureaus were put unde one roof. Such close collaboration was recommended by the IMO (Washington, 1947), fo whom this report was prepared. *Subject Headings:* **Meteorological services, Hydrologica services, Sweden.**—*M.R.*

10–20 551.501.9 551.58

Brychta, Jaroslav, **Ústav pro lékařskou Bioklimatologii a lidová Hvězdárna v Hradc Králové. (K jejich programovému zaměření.)** [The Institute of Medical Climatology an Observatory in Königgrätz. (Program suggestions.)] *Meteorologické Zprávy*, 3(4–5):78–79 Feb. 1950. **MH-BH**—A new institute and observatory were founded at Königgrätz on Apri 19, 1947. Basic activities of the observatory are to be cosmical, meteorological and climato logical research. The Bioclimatological Institute will collaborate with the local medica faculty in studying the effect of solar, climatic and meteorological factors on health and disease Research in the realm of nuclear physics and observations in special "climatic chambers" wil be conducted. *Subject Headings:* **Bioclimatology, Observatories, Medical meteorology Czechoslovakia.**—*M.R.*

EXPEDITIONS

10–21 551.506.5

Ahlmann, H. W:son, **De franska polarexpeditionerna.** [French polar expeditions.] *Ymer, Stockholm*, 68(3):231–233, 1948. **DLC**—A brief survey of recent French polar expedi tions in the Arctic and Antarctic. The Greenland expedition under the leadership of Paul Émile Victor has a comprehensive program of surveying a section across the Greenland ice

seismic measurements of ice depth; studies of ice ablation, accumulation, density, and temperature; and of climatic and meteorological observations at a station on the ice (75°N and 40°W); as well as cosmic ray and ionospheric measurements; meteoric and biological studies. The meteorological program included radiosonde observations and the station is to be continued for several years, being supplied by parachute and airplane. The station reports three times a week to Paris by radio. The Antarctic expedition includes oceanographic, hydrographic, geographical, geological, glaciological, meteorological and climatological investigations. It was to leave France October 1948 under the leadership of André Listard for reconnaissance and the full expedition would leave in 1949 to establish a permanent station on Adélie Land. *Subject Headings:* **Polar expeditions, Greenland, Antarctic.**—*M.R.*

10–22 551.506.5(491)

Brock, D. S., **Cambridge University Iceland expedition of 1947. Meteorology.** *Meteorological Magazine, London,* 79(938):219–222, Aug. **1950.** table. Swithinbank, C., **Oxford University Iceland expedition of 1947. Meteorology.** *Ibid.,* p. 222–224. fig. **DWB**—The Cambridge expedition was on the southwest margin of Drangajökull ice cap Aug. 5–Sept. 5, 1947. Month was stormy and cloudy; weather is briefly described and frequency of cloud types given. Distribution of snow and firn discussed. The Oxford expedition was in S.E. Iceland July 29–Sept. 8; observations were made near coast and on Vatnajökull. *Subject Headings:* **Expeditions, Iceland.**

10–23 551.506.5(09)

Court, Arnold, **Shipwrecked German weathermen winter in ice caves on Shannon Island, northeast Greenland.** *Arctic, Montreal,* 2(2):108–117, Sept. **1949.** 3 photos, map. **DLC**—An interesting and detailed account of the wreck of the Coburg on Shannon Island and the subsequent experiences and weather conditions during the five months (Nov. 19, 1943–June 3, 1944) that the German meteorologists maintained a weather reporting station at that place (lat. 75°N). Most of the information was obtained from an account published by Dr. E. G. Triloff in the 1946 and 1947 issues of Polarforschung (Kiel). Previous attempts at establishing stations in northeast Greenland mentioned. Photos made by U. S Coast Guard and map of region included. *Subject Headings:* **Meteorological stations, Arctic expeditions, Greenland.**—*M.R.*

10–24 551.506.5

Liljequist, Gösta H., **Richard E. Byrds fyra antarktiska expeditioner 1928–47.** [Richard E. Byrd's four Antarctic expeditions 1928–1947.] *Ymer, Stockholm,* 68(2):104–120, **1948.** 4 figs. **DLC**—A lengthy account (in Swedish) of the aims and accomplishments of the Antarctic expeditions of 1928–1930, 1933–1935, 1939–1941 and 1946–1947. There are several interesting charts and photos including one of the Antarctic Continent showing traverses made by "Operation Highjump" during 1946–1947 around the shelf-ice and from Little America toward the Pole. Meteorological information included is only that which is incidental to the general history of the expeditions. *Subject Headings:* **Polar expeditions, Little America, Antarctic.**—*M.R.*

10–25 551.506.5

Neunteufl, Josef, **Österreichs Anteil an der Erforschung der Arktis.** [Austria's share in the exploration of the Arctic.] *Geographische Gesellschaft, Wien, Mitteilungen,* 91(10–12):180–186, **1949.** 15 refs. **DLC**—Description of numerous expeditions to different parts of the Arctic in which Austria participated, including the discovery of Franz Josepf Land by Barents in 1596, the meteorological expeditions connected with the two International Polar Years (1883 and 1933), and the Greenland expeditions of the 20th Century. *Subject Heading:* **Arctic expeditions.**—*M.R.*

PHENOLOGY

10–26 551.506.8

Rosenkranz, Friedrich, **Die Vegetationszeit in Österreich.** [The vegetation period in Austria.] *Wetter und Leben,* 2(9–10):203–205, March **1950.** **DWB**—Duration of vegetation period from pre-spring (snowdrop, anemone, etc.) to autumn of mean daily temperature below

5°C. charted for Austria; chart described but not illustrated. Range from above 250 to below 150 days. *Subject Heading:* **Phenology.**—*C.E.P.B.*

10–27 551.506.8

Schüepp, Walter, **Phänometrisches Experiment über die "Winterruhe" einiger Pflanzen.** [Phenometric experiment on the "winter rest" of a few plants.] *Wetter und Leben*, 2(9–10):205–211, March **1950.** fig., 4 tables. **DWB** –Branches of forsythia, hazel and syringa were brought into a room in Nov. 1948 and their development measured. Three stages found: preparation for growth after rest; separation of growth components; main development phase. The first depends only on the calendar, the third is a function of accumulated temperature. A method of calculating this from daily extremes is described. *Subject Heading:* **Phenology.**—*C.E.P.B.*

10–28 551.506.8:523.74

Schneider, Max, **Laubentfaltung der Rosskastanien, Sonnenflecken und Märztemperatur.** [Leaf unfolding of horse chestnut, sunspots and March temperature.] *Deutscher Wetterdienst in der US-Zone, Berichte*, No. 12, p. 104–109, **1950.** 9 figs., 12 refs. **MH-BH**—Leafing of horse chestnut is early near sunspot maximum, late at sunspot minimum. This is due to high correlation between March temperature (Frankfurt/M.) and beginning of leaf unfolding; March temperature in Europe is correlated with sunspots. Mean pressure gradient East Europe–Iceland in March is much greater at and for two years before spot maximum than spot minimum, but this effect is shown only near maximum of 89-year sunspot period. *Subject Headings:* **Phenology, Sunspots.**—*C.E.P.B.*

10–29 551.506.8:634.8

Weise, Rudolf, **Über die Rebe als Klima-Kriterium.** [The vine as a climatic criterion.] *Deutscher Wetterdienst in der US-Zone, Berichte*, No. 12, p. 121–124, **1950. MH-BH**—Long-period homogeneous observations on growth of vine are not available. The quality of the wine is strongly influenced by cellar technique. The quality of the grape juice depends largely on the weather of the last two ripening months but shows wide scatter. The yield per ha. is influenced by weather over a much longer period and is a good criterion for local and general climate, with small scatter. *Subject Headings:* **Phenology, Viticulture.**—*C.E.P.B.*

10–30 551.506.8:634.9

*Tiurin, A. V., **Fenologicheskie nabliudeniia v lesakh SSSR i ikh lesokhoziaĭstvennoe ispol'zovanie.** [Phenological observations in the forests of the U.S.S.R. and their silvicultural importance.] *Lesnoe Khoziaistvo, Moscow*, 3(6):13–20, June **1950.** chart, 7 tables. **DLC**—A detailed comparison of phenological data observed in the forests throughout the U.S.S.R. during 1948 and 1949. The data and discussion are arranged by regions. In all parts of the Soviet Union (even the Far East), vegetation appeared one or two weeks later in 1949 than in 1948. *Subject Headings:* **Phenology, Forests, U.S.S.R.**—*M.R.*

INSTRUMENTS

10–31 551.508.2

Geiss, W., **Versuche über den Strahlungseinfluss auf kleine Platindrahtwiderstandsthermometer mit Cellonglasrahmen.** [Investigation of the effect of radiation on small platinum wire resistance thermometers with a cellon glass frame.] *Zeitschrift für Meteorologie*, 3(11–12):356–358, Nov.–Dec. **1949.** 2 figs., 2 append. **DLC**—Six platinum wires 0.02 mm. diameter were stretched on a frame holding a glass shield ½ mm. thick. Resistance 108 ohm at 20°C. Two such thermometers were exposed, one in shade and one in sun. Difference of temperature did not exceed 0.5°C. on a hot still day, so that practically no radiation error existed. *Subject Heading:* **Thermometers.**—*C.E.P.B.*

10–32 551.508.4

Gödecke, Karl, **Die "vollständige" Temperaturkorrektion an Stations-Barometern mit nicht einstellbarem Teilungsnullpunkt.** [The "complete" temperature correction for station barometers with non-adjustable zero.] *Annalen der Meteorologie*, 3(3–4):103–105, 1950

2 tables, 4 refs. Summaries in German and English p. 103. **DWB, MH-BH**—In Germany the temperature correction is usually based on the length of the mercury column above the zero. Author points out that this is only correct if the zero is adjustable. Allowance should be made for change of level in cistern. The errors of various types at 20°C. due to this factor are quoted, ranging from 0.079 to 0.198 mm. Hg. Error can be minimized by decreasing volume of mercury as far as consistent with safety. An iron plate which is often placed in the cistern of German barometers decreases the error. *Subject Headings:* **Barometers, Instrumental errors.**—*C.E.P.B.*

10–33 551.508.43

Huber, Armin, **"Thommen" pocket-type barometer and altitude meter.** *Microtecnic, Lausanne*, 11(3):128–133, June **1948.** 8 figs., table, equations. **DLC**—Well-illustrated article (in English) on a pocket altimeter, its construction and accuracy. *Subject Heading:* **Barometers.**—*M.R.*

10–34 551.508.53/4

Friedrich, W., **Feldwindfahne mit Stärkeanzeiger-Eichung.** [Field wind vane with indicating pressure gauge.] *Wetter und Leben*, 2(11–12):273–275, June **1950.** 2 figs. **DWB**—A thin metal plate kept normal to wind swings on a quadrant graduated directly in Beaufort force. *Subject Headings:* **Wind vanes, Anemometers.**—*C.E.P.B.*

10–35 551.508.822

Isono, K. and Huziwara, Y., **An improved radiosonde.** *Geophysical Magazine, Tokyo*, 21(2):127–134, March **1950.** 7 figs., table, 11 refs. **MH-BH**—The authors describe the principle and construction of an improved type code radiosonde which facilitates the automatic recording of signals, and the interpretation of the recoro; and permits simultaneous wind observations by radio direction finder. Schematic diagrams of the types of this apparatus and of the self recorder are presented. *Subject Headings:* **Radiosondes, Recording equipment.**—*I.L.D.*

10–36 551.508.822:551.501.7(02)

Tommila, Mauri and Väisälä, Vilho, **Handbook of sounding by means of the Finnish radiosonde.** *Finland, Ilmatieteellisen Keskuslaitoksen, toimituksia*, No. 31, **1947.** 70 p. 33 figs., 5 refs. (p. 6), 38 equations, append. **MH-BH**—A service manual which is intended as an aid to the observer in servicing the instruments and equipment and computing soundings made with the Finnish radiosonde (developed in 1931 and used widely since 1936). The first part of this manual deals with the construction and calibration of the Väisälä radiosonde and recorder, and the theory of the calibration and correction curves. The second part goes into the details of assembling, adjusting and launching the instrument and evaluating the radiosonde data. Included is a discussion of the theory and practice of computation of aerological forms of all types (devised by Väisälä for use in Finland). Part three discusses the radiation error (in the stratosphere) and its correction, and part four the calibration of humidity, pressure and temperature elements. Numerous detailed photographs, diagrams and charts show the equipment and even parts thereof, and illustrate the methods of evaluating data. *Subject Headings:* **Radiosondes, Upper air observations, Manuals, Finland.**—*M.R.*

SYNOPTIC ANALYSIS AND FORECASTING

10–37 551.509.312:551.511:551.515

§Angervo, J. M., **Über die Bewegung der Luft in einem Hochdruckgebiet.** [Air motion in an anticyclone.] *Finland, Ilmatieteelisen Keskuslaitoksen, toimituksia*, No. 29, **1947.** 20 p. 2 figs., 14 refs., 17 equations. **MH-BH**—Hesselberg's solution of the trajectory of a particle of air in a moving system is extended to the case of a moving anticyclone and the unique theoretical equation applied to a case (January 2, 1947) when a vast anticyclone moved across the Baltic (central pressure 1049 mb.) to northwest Russia. The equation is applicable to either the cyclonic or anticyclonic circulation fields. *Subject Headings:* **General circulation, Anticyclones, Kinematic analysis.**—*M.R.*

10–38 551.509.317/8

Hesse, W., **Ein Beitrag zum Steuerungsproblem; (vorläufige Mitteilung).** [A contribution to the problem of steering; (advance communication).] *Deutscher Wetterdienst in the US-Zone, Berichte*, No. 12, p. 135, **1950.** ref. **MH-BH**—Sixteen types of steering distinguished and "steering calendar" compiled (1935–1944). Full paper to be published in *Veröffentlichungen des Geophysikalischen Instituts, Leipzig. Subject Heading:* **Steering.**—*C.E.P.B.*

10–39 551.509.33

Dinies, E., **Beziehungen zwischen der Grosswetterlage im November und Dezember und dem nachfolgenden Winter; (vorläufige Mitteilung).** [Relations between the general weather situation in November and December and the following winter; (advance communication).] *Deutscher Wetterdienst in der US-Zone, Berichte*, No. 12, p. 72–75, **1950.** 9 figs., table. **MH-BH**—Author calculated correlation coefficients between temperature at Karlsruhe of each 5-day period Nov. 7 to Dec. 31 and following winter temperature. Coefficients negative in mid November, positive in December. Pressure changes over Europe from 65–68 pentad before four mildest winters plotted, show fall of pressure over British Isles; before four coldest winters a rise over British Isles and fall in northeast Europe. *Subject Headings:* **Long range forecasting, Temperature extremes.**—*C.E.P.B.*

10–40 551.509.33

Neis, B., **Die synoptische Methode der Langfristprognose der Schule B. P. Multanowsky (Teil 1).** [The synoptic method of long range forecasting of the B. P. Multanovsky school (Part 1).] *Zeitschrift für Meteorologie*, 3(10):304–309, Oct. **1949.** 3 charts, equations. Part II. *Ibid.*, 3(11–12):329–335, Nov.–Dec. 1949. 2 charts, 2 refs. **DLC**—A summary of Multanovsky's method of forecasting as described in Russian publications. Discusses pressure oscillations and waves, axes of travel of pressure centers and cumulative charts, natural synoptic periods and seasons. Illustrated by an example of the construction of a monthly forecast. Concludes that it is not a mechanical method but requires a synoptic flair. *Subject Headings:* **Long range forecasting, Multanovsky's method.**—*C.E.P.B.*

10–41 551.509.34:551.575

Saunders, W. E., **Method of forecasting the temperature of fog formation.** *Meteorological Magazine, London*, 79(938):213–219, Aug. **1950.** 4 figs., table. **MH-BH**—Examination of 48 cases of fog at Northolt, near London, showed that the temperature at which fog forms could be forecast within 1°F. from the dew point curve on the radiosonde tephigram at 1500. Three types of hydrolapse are defined and procedures for forecasting set out. *Subject Heading:* **Fog forecasting.**

10–42 551.509.34:551.524

Van Mieghem, Jacques, **La temperature de l'air au sol.** [Surface temperature.] *Ciel et Terre*, 66(5–6):113–116, May-June **1950.** ref. **DLC**—A brief discussion of the difficulties involved in forecasting surface temperatures under varying meteorological conditions, even if the exact amount of solar radiation were known. Cloudiness, wind, soil moisture and humidity play important roles in the radiation balance and the resulting air temperature regime. *Subject Heading:* **Temperature forecasting.**—*M.R.*

10–43 551.509.53:551.524

Inglis, G. A. and Jefferson, G. J., **Temperature rise on clear mornings.** *Meteorological Magazine, London*, 79(938):236–237, Aug. **1950.** **MH-BH**—Inglis refers to curves of monthly input of solar energy to lower atmosphere given by Jefferson (*see item* 6–22 in *Meteorological Abstracts and Bibliography* 1(6), June 1950) and suggests an equation to fit them. Reply by Jefferson. *Subject Heading:* **Temperature forecasting.**

10–44 551.509.67:551.577

Bergeron, Tor, **Nyare rön om nederbördens uppkomst och fördelning.** [Advances in the field of the physics and geographical distribution of precipitation.] *Ymer, Stockholm*, 3:161–188, Sept. **1949.** 24 figs., 13 refs. Summary in English p. 185–187. (Reprint available.)

MH-BH—A well-illustrated summary of the theory and applications of cloud physics and rain formation, especially in the light of recent experiments in artificially inducing rain or snow. Written for geography students, the article contains a thorough exposition of the technical aspects of convection, supercooling, condensation, cloud formation, glaciation, nucleation and cloud seeding. The orographic effects on moisture laden winds are discussed, leading to the theory that rainfall might be decreased on the windward slopes and caused to fall by natural processes in the leeward regions (as in Sweden), by *over-seeding* of clouds with silver iodide on the coasts of Norway. This article is a fuller exposition of the theme presented by the author in *Tellus*, 1:1 and 3, 1949. (*See items* C–168 and C–169 in *Meteorological Abstracts and Bibliography* 1(3), March 1950.) *Subject Headings:* **Cloud seeding, Artificial precipitation.**—*M.R.*

10–45 551.509.67

Brooks, Charles F., **Will New-York rainmaking affect New England rainfall?** *Weatherwise*, 3(2):30–31, April **1950.** 2 photos. **MH-BH**—The author is of the opinion that seeding over New York might increase, just as easily as decrease, the rainfall over New England. *Subject Headings:* **Artificial precipitation, New England.**—*M.R.*

10–46 551.509.67

Howell, Wallace E., **More rain for New-Yorkers?** *Weatherwise*, 3(2):27–29, April **1950.** 3 photos. **MH-BH**—Brief description of proposed scheme for filling New York City reservoirs, at that time only 40% full. Pictures of important persons involved in project and of a cumulus cloud at Albuquerque before and after seeding (by Langmuir). *Subject Headings:* **Artificial precipitation, Cloud seeding, New York.**—*M.R.*

STRUCTURE AND PHYSICS OF THE ATMOSPHERE

STRUCTURE OF THE ATMOSPHERE

10–47 551.510.52 551.524.7

Tojo, S., **On the thermal structure of troposphere over Japan, in 1947.** *Geophysical Magazine, Tokyo*, 21(2):166–176, March **1950.** 7 figs., 7 tables, 5 equations. **MH-BH**—The mean thermal structure of the troposphere has been investigated by means of upper air soundings which reached 9–16 km. The lapse rate obtained with radiosonde is 0.51°C. per 100 m. as compared with 0.56°C. for mountain lapse rate. An empirical relationship has been established between mean lapse rate of troposphere, surface air temperature and height of troposphere. The total mean lapse rate throughout the troposphere is 0.56°C. In relation to lapse rate and seasonal variation of temperature the troposphere is divided into three parts having distinct thermal characteristics. The order of heat transfer due to turbulence is calculated for the lower troposphere and the lapse rate in the middle troposphere is discussed. *Subject Headings:* **Structure of troposphere, Upper air temperatures, Lapse rates.**—*I.L.D.*

10–48 551.510.52:621.396.11

Gibson, Theodore W., Jr., **Meteorological aspects of radio propagation.** *Weatherwise*, 3(2):32–34, April **1950.** 4 figs. **MH-BH** --Brief explanation of the effect of varying lapse rates of humidity and temperature on normal and anomalous propagation of microwaves (television and FM). *Subject Headings:* **Radio transmission ducts, Television.**—*M.R.*

10–49 551.510.52:621.396.11

Jones, R. F., **Low-level atmospheric ducts.** *Nature, London*, 163(4147):639, April 23, **1949.** 2 refs. Discussion, J. S. McPetrie and B. Starnecki p. 639. **DLC**—Jones presents a plausible hypothesis for the formation of low level radio transmission ducts over the sea during strong wind conditions and during still air. Humidity lapse rates when strong winds come from cold areas and temperature and humidity lapse rates when winds come from warm areas, create conditions favorable for these "ducts" in the lower 100 feet above the sea. Presence of spray also considered important during turbulent conditions (discussion). *Subject Heading:* **Radio transmission ducts.**—*M.R.*

10–50 551.510.52:621.396.11

Knighting, E., **Elements of anomalous radio propagation.** *Meteorological Magazine, London*, 79(933):74–81, March **1950.** 4 figs., 6 photos, 5 refs., 4 equations. **DWB**—The derivation of a "Modified Refractive Index" (MRI) is stated and it is shown that the conditions necessary to bend a short-wave radio beam downwards are a temperature inversion and/or a lapse rate of mixing ratio such that: temperature gradient (°F. per 1,000 ft.)/7+2×humidity lapse (gm. kg. per 100 ft.)/3 exceeds 1. Observations show that this condition frequently holds, especially over the sea, over a layer ("Duct") on or near the earth's surface. Illustrations of calculated MRI curves are given, and the tracks of beams through or under a duct. Application of electromagnetic wave theory shows why shorter wave lengths are more affected by super-refraction. *Subject Heading:* **Radio transmission ducts.**—*C.E.P.B.*

10–51 551.510.52:621.396.11

Yerg, Donald G., **The importance of water vapor in microwave propagation at temperatures below freezing.** *American Meteorological Society, Bulletin*, 31(5):175–177, May **1950.** 5 figs., table, 2 refs., 4 equations. **DWB, MH-BH**—Nomograms show contribution of vapor pressure to refractive index at various temperatures (0° to −40°C.) and to dn/dh (slope of the index curve) for temperature inversions in a saturated atmosphere. Modified index of refraction curves computed by neglecting and then by including vapor pressure as obtained from radiosonde flights at Fairbanks and Bethel. Conclusion is that vapor pressure cannot be neglected at temperatures above −35°C. *Subject Headings:* **Radio transmission ducts, Vapor pressure, Nomograms, Fairbanks, Alaska.**—*M.R.*

10–52 551.510.534

Miyake, Y. and Saruhashi, K., **A photochemical theory on the formation of the ozone layer in the atmosphere.** *Geophysical Magazine, Tokyo*, 21(2):99–107, March **1950.** 6 figs., 7 refs., 33 equations. **MH-BH**—The photochemical theories of the formation of ozone in the atmosphere proposed by Chapman, Wulf-Deming and Nicolet are inadequate as light with wave length less than 1750°A, which dissociates oxygen molecules into atoms, is absorbed at an altitude of 80 km. and the absorption coefficients in the Herzberg region are very small. The authors modify Mecke's reactions of formation and dissociation of ozone by postulating a third molecule as an atom to which heat is transferred. The fundamental equation of photochemical equilibrium differs from Mecke's in that the light absorption coefficients of oxygen and ozone are calculated by integrating over each effective range of wave length. The altitudinal distribution of ozone calculated by the theoretical assumptions are in good agreement with observational data. *Subject Heading:* **Ozone layer.**—*I.L.D.*

10–53 551.510.535

Höchtl, Fritz and Rawer, Karl, **Observations de la couche E sporadique de l'ionosphère réalisées par plusieurs stations en Europe.** [Observations of the sporadic *E*-layer of the ionosphere carried out by several stations in Europe.] *Annales de Géophysique*, 5(2):150–156, Feb. **1949.** 5 figs. Summary in English p. 150. **MH-BH**—The maximum concentration of electrons in an ionosphere layer is characterized by a critical frequency, defined as the maximum frequency reflected by the layer. Critical frequencies of the sporadic *E* layer (of *Es*) are compared by means of correlation coefficients calculated between pairs of four European stations. Deviations from the mean daily values for each station are utilized to calculate the coefficients. In the case of daily correlation coefficients the correlation diminishes rapidly with increasing distances. There is no homogeneity in sporadic *E* ionization for distances beyond 100 km. and no correlation exists for distances greater than 500 km. Monthly correlations between maximum daily values of the critical frequency or between number of measurements exceeding a certain limit each day give similar results. Only in regions having a diameter less than 1000 km. is it possible to characterize a single day as having much or little sporadic ionization. *Subject Heading:* **Ionospheric layers.**—*I.L.D.*

10–54 551.541:551.510.535

Martyn, D. F., **Cellular atmospheric waves in the ionosphere and troposphere.** *Royal Society of London, Proceedings, Ser. A*, 201(1065):216–234, March 22, **1950.** 7 figs., 23 refs.,

32 equations. **DWB, DLC**—A theory of travelling oscillations in an atmosphere bounded by two discontinuity surfaces is developed in detail. An ionospheric disturbance passing over Australia on June 9, 1948, is then analyzed to determine the horizontal rate of movement of ionospheric clouds of electrons (10 km/min. for 1000 km.) and one on June 22, 1948 to obtain the height (290 km.) and density gradient of ionization in the F_2 layer at such time. Using data on microbarometric oscillations in the troposphere, where known or assumed, lapse rate conditions allow comparable rates of movement, the author creates a model of a series of atmospheric waves with cellular structure moving horizontally in the ionosphere so as to produce the observed travelling disturbances in electron density. *Subject Headings:* **Ionospheric disturbances, Microbarometric oscillations.**—*M.R.*

10–55 551.515:551.510.535

Munro, G. H., **Travelling disturbances in the ionosphere.** *Royal Society of London, Proceedings, Ser. A*, 202(1069):208–223, July 7, **1950.** 10 figs., 12 refs. **DLC**—Methods of observing horizontal and vertical movements of ionospheric disturbances described. Network of radio stations set up near Canberra, and data from Canberra, Sydney and Brisbane used to show horizontal movements of areas of variable vertical density. Periodicity, magnitude, direction and velocity discussed and plotted on polar coordinates. Mean monthly vectors shown. Conclusion that in southeast Australia, quasi-periodic disturbances of *F* layer with periods of 10–60 minutes are frequent in daytime. Except for fade outs during solar flares, these areas show horizontal motion in the nature of "fronts" 40 km. or more in length, travelling sometimes 900 km. without change. Groups of disturbances are consistent in direction for several days. No diurnal variation detected, but a definite seasonal variation is noted (about 90° between winter and summer). *Subject Headings:* **Ionospheric disturbances, Australia.**—*M.R.*

10–56 551.510.535

†*Stranz, Dietrich, **Die D-Schicht.** [The *D* layer.] *Deutscher Wetterdienst in der US-Zone, Berichte*, No. 14, **1950.** 31 p. 19 figs., 12 tables, 62 refs., 18 equations. **MH-BH**—This is a comprehensive analysis and description of the probable photochemical processes producing the *D* layer of the ionosphere and of its behavior. The origin of the normal *D* layer is attributed to W- radiation and to P-radiation. Increased ionization produced by sudden, intense UV radiation in the hydrogen-resonance-radiation of the Lyman system and in the metallic continuum of the extreme ultraviolet range increases the thickness of the *D* layer and displaces its lower boundary downward. Temperature and height of the sun increase the absorption of short wave radiation by day. Irregular variations in the absorption of short wave radiations are produced by disturbances in the chromosphere. Increased density of ions and rise in temperature by day at 90 km. produce atmospheric currents causing temporary variations in the earth's magnetic field and an additional component in the circulation of the stratosphere. The author sets up these atmospheric models, based upon temperature, within which he postulates the operation of photochemical processes, and he establishes a *D* layer where density of charge carriers explains the damping of electromagnetic waves and the Mögel Dellinger effect upon different frequencies. *Subject Headings:* **Ionosphere, D layer.**—*I.L.D.*

MECHANICS AND THERMODYNAMICS OF THE ATMOSPHERE

10–57 551.511(08)

†Kochin, Nikolaĭ Evgrafovich, **Sobranie sochineniĭ, Tom I.** [Collected works, Vol. I.] Moscow, Izdatel'stvo Akademii Nauk, SSSR, **1949.** 613 p. figs., tables, refs., biblio. (91 items). **DLC**—A short biographical sketch by P. IA. Polubarinova-Kochina (wife of N. E. Kochin) tells of his education, early military service, scientific, academic and official connections; his collaborators and students. He owed much to A. A. Fridman who founded the Department of Dynamic Meteorology at the Leningrad Geophysical Observatory (1920). Kochin succeeded Fridman on the death of the latter in 1925, and in his Institute of Theoretical Meteorology, his wife, Izvekov, Kibel' and Keller made further investigations in theoretical and applied hydrodynamics and meteorology.

A chapter by A. A. Dorodnitsyn, I. A. Kibel', and L. I. Sedov goes into detail about the principle works of Fridman, Kochin and their associates; based on the theoretical work of Rayleigh (1917), Shaw (1919) and the Bjerkneses.

The main part of the volume (p. 27–613) consists of a selection of 25 of the most important works on dynamic meteorology (91 are listed in the bibliography on p. 20–24), written by Kochin during the period 1922–1942 and published in leading Russian, German and French scientific journals from 1923 to 1949 (four years after his death). The first paper was on the change of a vortex through adiabatic motion in the absence of any inflow of energy (*Zeit. für Physik*, 1923). One on a **Theoretical model of a moving cyclone** (1924), many on the theory of discontinuities, the polar front and other boundary layer problems appeared shortly after Rossby's 1924 paper (*Geografiska Annaler*, p. 180).

A paper on the **Stability of the zonal circulation** (1927), and one published in 1935 **On the change of temperature and pressure in the free atmosphere** (p. 531–591) are classical papers giving the basic integral equations and graphic models for quantitatively evaluating changes in solenoidal fields—works which lead to the practical applications of Kibel' (1940–1943). Another classic work in application of hydrodynamic theory to the atmospheric circulation is comprised in the three papers published in 1937 on the **Influence of relief (ground profile) on waves at the boundary of two air masses of different density** (p. 448–508).

Kochin was recognized as an authority on many other phases of mathematical physics, aerodynamics, hydrodynamics and pure mechanics, and did practical work in ballistics, jets, turbulence, shock waves, explosive waves, slip streams, etc. and taught many courses in the universities at Leningrad, Moscow and Kazan and in Military or Naval Academies.

Volume II [**Hydrodynamics and aerodynamics**] has been abstracted. (See item 8–36, Meteorological Abstracts and Bibliography, 1(8), Aug. 1950.) *Subject Headings:* **Dynamic meteorology, Collected works, N. E. Kochin, Bibliographies, Biography.**—*M.R.*

10–58 551.511 551.551 551.573

Davies, D. R., **A note on three-dimensional turbulence and evaporation in the lower atmosphere.** *Royal Society of London, Proceedings, Ser. A*, 202(1068):96–103, June 22, **1950.** 2 tables, 8 refs., 4 equations. **DLC**—Calder (1949) worked out the theory for vertical distribution of vapor down wind from a short grass *plane* surface which is uniformly wetted. He allowed for aerodynamic roughness, but assumed adiabatic conditions. Deacon (1949) extended this theory to cover non-adiabatic conditions, and Sutton (1949) applied his statistical theory to cover *three-dimensional* diffusion from a continuous point source. The author now applies his earlier (1947) three-dimensional model of turbulence to the above problem, to determine the vertical distribution of vapor at the down-wind edge of a parabolic area and incidentally to determine the *evaporation* from a *finite* area. He gets good agreement between theory and observation for points above or not too far removed from the area in question. Finally, the formal connection between the two- and the three-dimensional theories is shown mathematically and the results of measurements are compared with calculations for 1, 8, 24 and 48 inches above and 0, 2.5 and 5.0 yards from the axis of an area 10 yards across. *Subject Headings:* **Turbulence, Evaporation.**—*M.R.*

10–59 551.511

Dinkelacker, Otto Friedrich, **Der I Hauptsatz der Thermodynamik für die freie Atmosphäre.** [The first law of thermodynamics in the free atmosphere.] *Deutscher Wetterdienst in der US-Zone, Berichte*, No. 12, p. 34–36, **1950.** 3 refs., 16 equations. **MH-BH**—Derives equations for access of energy to a gas in the free atmosphere and dry adiabatic. *Subject Heading:* **Thermodynamics of the atmosphere.**—*C.E.P.B.*

10–60 551.511

Kano, K., **On the Richardson's criterion concerning the increase or decrease of turbulent energy in the free atmosphere.** *Geophysical Magazine, Tokyo*, 21(3):220–226, March **1950.** 10 refs., 17 equations. **MH-BH**—From the fundamental equations for the motions of wind motion the author deduces L. F. Richardson's criterion for the increase or decrease of energy of turbulent flow in the atmosphere. *Subject Heading:* **Turbulent exchange.**—*I.L.D.*

10–61 551.511:551.557

Kaufmann, P., **Bemerkungen zum Jet-stream im Atlantik-Wetterdienst.** [Remarks on the "jet stream" in the Atlantic weather service.] *Deutscher Wetterdienst in der US-Zone, Berichte*, No. 12, p. 200–201, 1950. **MH-BH**—A brief general discussion of hydrodynamics of the jet stream as it appears in 700 and 500 mb. charts and its bearing on forecasting. *Subject Headings:* **Jet stream, Upper air winds.**—*C.E.P.B.*

10–62 551.511:551.55

Petterssen, Sverre, **Note on the relation between the actual wind and the geostrophic wind.** *Journal of Meteorology*, 7(1):76–77, Feb. 1950. fig., ref., 9 equations. **DWB**—Theoretical derivation showing that cyclonic motion may occur on any scale (from dust whirls to major circulation systems) whereas anticyclonic motion may be of three kinds: that limited to large systems, to small temporary systems and a special kind which occurs to the right of the anticyclone path and on upper troposphere wedges. *Subject Headings:* **Geostrophic winds, Vorticity.**—*M.R.*

10–63 551.511:551.557

Prandtl, L., **Dynamische Erklärung des Jet-stream-Phänomens.** [Dynamical explanation of the jet stream phenomenon.] *Deutscher Wetterdienst in der US-Zone, Berichte*, No. 12, p. 198–200, 1950. 2 figs., 3 refs., equations. **MH-BH**—By applying hydrodynamic laws to stable stratified air masses which form part of the earth's rotation, it is shown that the jet-like air streams which occur over rain areas in the higher layers are due to the upward force of the air masses from which rain is falling. *Subject Headings:* **Upper air winds, Jet stream.**—*C.E.P.B.*

10–64 551.511:532.5

Miller, James E., **Energy transformation functions.** *Journal of Meteorology*, 7(2):152–159, April 1950. table, 12 refs., 40 equations. **DWB, MH-BH**—Derivation of energy equations for potential energy, kinetic energy of eddy and average motion, and thermal energy on the basis of four postulates, in order to show the significance of the energy transformation functions. *Subject Headings:* **Hydrodynamics, Energy equation.**—*M.R.*

GENERAL CIRCULATION

10–65 551.513

§Rossby, Carl-Gustaf, **On the nature of the general circulation of the lower atmosphere.** (In **Atmospheres of the earth and planets,** Gerard P. Kuiper, (ed.) Chicago, University of Chicago Press, [1949]. p. 16–48. 24 figs., 27 refs.) **DLC**—Both theoretical and observational considerations indicate the inadequacy of the idea that a simple thermal circulation is the dominant factor in the mechanism of the trade winds and that the general circulation is based upon the conservation of angular momentum as the leading dynamic principle. The ever changing quasi-horizontal circulation patterns and their statistical effect upon the distribution of general motion in the atmosphere are analyzed by comparing the atmosphere to a spherical shell in which the latitudinal distribution of the mean zonal motion is determined primarily by lateral mixing processes. This dynamic model cannot account for the generation of kinetic energy in the atmosphere. The general motion of the atmosphere is depicted as an orderly effect of lateral mixing processes associated with quasi-horizontal eddy patterns. An attempt is made to explain the jet stream phenomenon as the result of progressive mixing processes emanating from high latitudes. The quasi-horizontal circulation set up through the release of the potential energy supply of unstable air masses of different densities is dispersed around the globe and the kinetic energy obtained from many sources of this type ultimately accumulates in one or several jet stream zones. *Subject Headings:* **General circulation, Jet stream.**—*I.L.D.*

10–66 551.513.1

Neis, B., **Zum Begriff der allgemeinen Zirkulation der Atmosphäre.** [On the concept of the general circulation of the atmosphere.] *Zeitschrift für Meteorologie*, 4(3):72–77, March

1950. equations. **MH-BH**—Summarizes views of various authors on the maintenance of the atmospheric circulation, especially the west winds of middle latitudes. Author then discusses transformations of energy in the troposphere. A calculation of the energy process in the development of high and low pressure regions of middle latitudes leads to a value of excess pressure in the subtropical highs of about 46 mb. *Subject Heading:* **General circulation.**—*C.E.P.B.*

10–67 551.513.2

Martin, Donald E. and Hawkins, Harry F., Jr., **The relationship of temperature and precipitation over the United States to the circulation aloft.** *Weatherwise*, 3(3):65–67, June 1950. 3 figs. **MH-BH**—The use of composite charts of 700 mb. height anomalies to study the circulation over North America and to make objective forecasts based on typical anomalies which occur at the time of extreme summer or winter temperatures at Denver, Evansville and Boston. *Subject Headings:* **General circulation, Objective forecasting, United States.**—*M.R.*

10–68 551.513.2

Flohn, Hermann, **Die planetarische Zirkulation der Atmosphäre bis 30 km. Höhe.** [The planetary circulation of the atmosphere up to a height of 30 km.] *Deutscher Wetterdienst in der US-Zone, Berichte*, No. 12, p. 156–161, 1950. 4 figs., 36 refs. **MH-BH**—Sections from North to South Pole are constructed to show mean heights of 8 isobaric surfaces (1000–12.5 mb.) in winter and summer. From these, meridional sections of E–W components up to 30 km. are obtained. Members of circulation are defined as: Trade, Counter-trade, Upper trade, Extratropical W-wind zone, polar E-wind caps. In the Trade and Upper trade are occasional local W-winds. All members of the circulation are gradient winds. Differences in circulation of North and South Hemispheres are attributed to land and sea distribution. Fig. 4 compares apparent angular velocity of earth's clouds with surface of Jupiter and sun. *Subject Heading:* **General circulation.**—*C.E.P.B.*

10–69 551.513.2(57)

*Flohn, Hermann, **Grundzüge der atmosphärischen Zirkulation über Sibirien und dem angrenzenden Polarmeer.** [The fundamental features of atmospheric circulation over Siberia and the adjoining Polar Sea.] *Polarforschung, Kiel*, Ser. II, 17(1–2):143–149, Aug. 1947. 4 tables.—An analysis of pilot balloon observations since 1924 and temperature soundings since 1932, up to 10 or 12 km. over Siberia and the Arctic leading to a tentative model of the tropospheric circulation and structure for summer and winter. Inversions of temperature extend to great height in winter over Siberia. In summer the inversions over the Arctic seas are shallow and limited but result in frequent fog and stratus. *Subject Headings:* **Atmospheric circulation, Structure of troposphere, Siberia.**—*M.R.*

ATMOSPHERIC DISTURBANCES

10–70 551.515

†§Venho, S. N., **A study of meteorological phenoemena connected with the outflow of polar air masses over western Europe.** *Finland, Ilmatieteellisen Keskuslaitoksen toimituksia*, No. 33, 1949. 75 p. 30 figs., 3 tables, 72 refs., equations. **MH-BH**—A detailed synoptic aerological study of the structure and movement of a cold polar air mass which passed over northern Europe during late April 1939. In addition the problems of anticyclogenesis, seclusion of cold air, the formation of the upper level cyclone and the characteristics of the tropopause (based on data from seven stations in north and west Europe) are considered. Tropopause varied from 6.0 to 10.9 km. during the passage of this air mass. *Subject Headings:* **Synoptic-aerological studies, Anticyclones, Cyclogenesis, Tropopause.**—*M.R.*

10–71 551.515.1

James, R. W., **What is movement?** *Weather*, 5(2):52–55, Feb. 1950. **DWB**—Argues that the movem ent of a pressure field such as a depression cannot be measured by the movement of a single point (e.g., center of lowest pressure) but must be integrated over the whole field. *Subject Heading:* **Atmospheric circulation.**

10–72 551.515.11:532

Brun, Edmond and Vasseur, Marcel, **La mécanique des suspensions dans le cas d'un cyclone.** [The mechanism of suspension in a cyclone.] *France, Centre National de la Recherche Scientifique, Journal des Recherches,* 2(6):112–117, **1948.** 3 figs., 2 refs., 29 equations. **MH-BH**—The authors develop a theory for the movement of a particle suspended in a vortex with central outflow, under conditions to which Stokes' law is applicable. In a given outflow, varying the size of the particle or the velocity of outflow, without modifying the lines of current, does not alter the totality of trajectories. For a given particle of density greater than that of the fluid, there exists a circular and stable trajectory which it can traverse in a uniform movement. An infinity of other trajectories of identical particles are asymptotic to this circle. The theoretical considerations have been tested experimentally, qualitatively but not quantitatively. *Subject Headings:* **Cyclone structure, Fluid mechanics.**—*I.L.D.*

10–73 551.515.11

Hollmann, G., **Fronten und Entwicklungsphasen einer wandernden Zyklone im mitgeführten Koordinatensystem.** [Fronts and development phases of a travelling cyclone referred to coordinates moving with it.] *Zeitschrift für Meteorologie,* 4(1–2):39–47, Jan.–Feb. **1950.** 12 figs., 13 refs., 38 equations. **MH-BH**—The air trajectories of a cyclone moving uniformly in a straight line are calculated, with and without friction, referred to the moving center, for various speeds of movement and wind speeds. The diagrams show the cold front due to friction as a strong convergence line; the warm front is less developed. It is inferred that the front (as opposed to the frontal zone) is a characteristic of the surface friction layer. With parallel straight isobars in the warm sector the speed of translation agrees with the wind component parallel to the isobars. *Subject Headings.* **Cyclones, Fronts.**—*C.E.P.B.*

10–74 551.515.11 551.515.71

Wippermann, Fr., **Über die Rolle der dynamischen Labilität bei der Zyklogenese.** [On the role of dynamic lability in cyclogenesis.] *Deutscher Wetterdienst in der US-Zone, Berichte,* No. 12, p. 180–182, **1950.** fig., 5 refs., equation. **MH-BH** —Cyclones and anticyclones are regarded as changes of equilibrium resulting from the effect of *austausch* on the isobaric surfaces. *Subject Headings:* **Cyclogenesis, Dynamics of the atmosphere.**—*C.E.P.B.*

10–75 551.515.23

Fukuda, K., **On the periodical appearance of abnormally low air temperature in Tôhoku district and some particular path of typhoon, and the sea water temperature.** *Geophysical Magazine, Tokyo,* 21(2):125–127, March **1950.** 2 figs. **MH-BH**—The summer air temperature of the Tôhoku district varies with the temperature of the waters of the coast of Hokkaido and like the latter it has a 30 year cycle. The paths of typhoons indicate that the tropical easterly zone has a meridional oscillation with a 30 year period. When it extends north the cold air masses diminish and summer air temperature in Tôhoku is high; when the zone retreats southwards the summer air temperature is low, as cold air masses increase. When the tropical easterly wind predominates, the Kuroshio current inclines westward and the water off the west coast of Hokkaido is warmed so that the water temperature varies with the tropical easterly current. *Subject Headings:* **Hurricane tracks, Typhoons, Periodicities, Marine influences, Japan.**—*I.L.D.*

10–76 551.515.3

Hurd, Willis Edwin, **Some phases of waterspout behavior.** *Weatherwise,* 3(4):75–78, 82, Aug. **1950.** 4 figs. **MH-BH**—A popular account of waterspout formation and structure, based on over 20 years of experience in marine meteorological work. Includes several good photographs and a schematic diagram of waterspout structure. *Subject Headings:* **Waterspouts, Marine meteorology.**—*M.R.*

10–77 551.515.4:629.13

Brice, D. A., **Cu-Nim gusts. Some implications of an important investigation into thunderstorm flying.** *Flight, London,* 57(2142):32–34, Jan. 12, **1950.** 2 photos. **DLC**—A concise summary of the report on 1300 penetrations of thunderstorms (in the eastern U. S.)

by the All-Weather Flying Division of the U. S. Air Force (U. S. Civil Aeronautics Authority **Aviation Safety Release No. 304**). Based on experience with military aircraft, the conclusion is that a pilot should never turn back once he has entered a thunderstorm. Maximum gust velocities did not exceed 43 ft./sec., and draught velocities 100 ft./sec. with loss of altitude <2000 ft. and gain of <6000 ft. Best height is as low as possible for safety over terrain worst height 14–20 thousand feet. Data on frequency of various gust velocities and hail size distribution obtained during these flights are mentioned. None of the 1300 flights was disastrous to aircraft. *Subject Headings:* **Thunderstorms, Aviation, Vertical velocities.**—*M.R.*

10–78 551.515.8:551.577.5

Rossi, Veikko, **On the effect of the Scandinavian mountains on the precipitation fronts approaching from the sea.** *University of Helsinki, Institute of Meteorology, Papers*, No. 60 **1948.** 23 p. 23 figs., 21 refs. (Reprint from *Fennia* 70, No. 4.) **DWB, MH-BH**—Seasonal isohyetal charts are presented for Scandinavia, showing effect of mountains on mean precipitation. Annual total varies from 3000 mm. on the western slopes to 600 mm. (in Finland) or 500 mm. (in Sweden) on the eastern slopes. Similar charts are presented to show the average rainfall according to selected synoptic situations, passage of various types of fronts, air masses, air trajectories, speed of movement of fronts, isallobaric tendencies, etc. Study based on data for 152 stations and synoptic charts for period 1900–1939, obtained from the Meteorological Services of Norway, Sweden and Finland. *Subject Headings:* **Precipitation, Topographic effects, Scandinavia.**—*M.R.*

10–79 551.515.8:4

Sansom, H. W., **The structure of cold fronts.** *Weather*, 5(8):290, Aug. **1950. MH-BH**—Repeats Bergeron's proposal that terms "Anafront" and "Katafront" should be used to define fronts at which warm air is respectively ascending and descending. *Subject Heading:* **Cold fronts.**

RADIATION AND TEMPERATURE

RADIATION

10–80 551.52:551.481

†*Sauberer, Franz and Ruttner, Franz, **Die Strahlungsverhältnisse der Binnengewässer** [Radiation conditions of inland waters.] Leipzig, Becker and Erler, **1941.** 240 p. 73 figs., 59 tables, refs. (p. 213–224), 30 equations. (Probleme der kosmischen Physik, Vol. 21.) **DLC**—A thorough and systematic treatment of all phases of radiation (of various wave lengths) absorption, reflection, penetration and biologic effects thereof, in connection with inland lakes and seas. Includes theoretical, instrumental and practical aspects, as well as a large amount of summarized observational data and many schematic diagrams. The bibliography is most extensive and is grouped according to subjects. *Subject Headings:* **Radiation, Lakes.**—*M.R.*

10–81 551.521:91

*Grigor'ev, A. A., **O geograficheskikh radiatsionnykh rubezhakh i kharakteristikakh radiatsionnykh uslovii gorizontal'nykh fiziko-geograficheskikh zon.** [On geographical radiation zones and characteristic radiation conditions of horizontal physico-geographic zones.] *Problemy Fizicheskoĭ Geografii*, 12:11–31, **1946.** 11 tables, 6 refs. **DLC**—In recognition of the fact that radiation conditions are the most important factors in physico-geographical processes, the author has devised a classification scheme based on the average effective incoming radiation in eight geographic zones. Detailed tables show actual radiation (g.cal.) received on a horizontal surface at numerous places in various latitudes and longitudes, and the classification on the author's eight point scale (1–8) which would apply to each place for any given month. The wide variation in conditions along any parallel of latitude at any season is thus clearly seen; in some cases being much more pronounced than the meridional or seasonal variation. The author recognizes that the observational material used as criteria for this classification is not very accurate, so the scale has been drawn rather crudely. *Subject Headings:* **Radiation zones, Radiation variations, Climatic zones.**—*M.R.*

10–82 551.521(02)

Raethjen, Paul, **Kurzer Abriss der Meteorologie dynamisch gesehen. Teil II. Wärmehaushalt der Atmosphäre.** [Brief outline of meteorology from a dynamic view point. Pt. II. Heat economy of the atmosphere.] *Geophysikalische Einzelschriften, Hamburg,* **1950.** p. 103–152. numerous figs., tables, refs. and equations. **MH-BH**—Pt. I of this series: **Konstitution der Atmosphäre,** covered the structure and dynamics of the atmosphere, etc. (*see item* 7–29 in *Meteorological Abstracts and Bibliography,* 1(7), July 1950). This volume consists of three chapters (VII, IX and X) which cover **Insolation, Terrestrial Radiation** and the **Planetary Balance,** respectively. In these chapters there are diagrams, graphs and tables showing the nature of the solar spectrum, the annual variation in incoming radiation, atmospheric absorption, diffuse radiation, albedo, selective emission (the atmospheric spectrum), water vapor and CO_2 absorption, the effect of clouds and haze, stability, etc. Finally, the climatological aspects of the hydrologic cycle and radiation balance (vertical transport of heat and moisture) over the earth and between the troposphere and stratosphere are treated. Numerous quantitative examples are posed and solved by means of the data and tables of physical constants which are presented. *Subject Headings:* **Energy exchange, Thermodynamics of the atmosphere, Radiation, Textbooks.**—*M.R.*

10–83 551.521:551.586

Schulze, Rudolf, **Das Strahlungsklima der Erde.** [The radiation climate of the earth.] *Annalen der Meteorologie, Medizin-meteorologische Hefte,* (1):6–13, **1949. MH-BH**—Pt. I describes briefly types of extraterrestrial and terrestrial radiation, variations with sunspots, etc., effect of passage through atmosphere, physical results (ionization, etc.) and distribution over earth's surface. Pt. II considers influence on climate, weather and life. For climate the sun's photospheric radiation is important, for local weather the short wave ultraviolet from faculae and the infrared from the atmosphere and for general biological effects visible light (e.g., by glucose formation). Correlation between weather and disease is mostly due to deleterious high frequency radiation. *Subject Headings:* **Radiation, Bioclimatology.**—*C.E.P.B.*

10–84 551.521.1

†*Bider, M. and Thams, Chr., **Messungen der Abkühlungsgrösse nord- und südwärts der Alpen.** [Measurement of the cooling power north and south of the Alps.] *Switzerland, Meteorologische Zentralanstalt, Annalen,* p. 1–6, **1945.** tables, 11 refs. (Reprint available.) **DWB**—Three methods of measuring the cooling effect of the atmosphere are described. The Davos frigorimeter used at Basel (1929–1940), Zurich and Locarno (1936–1944) is described in detail and the observations made at those places presented in consolidated tables and compared with respect to exposure. The author concludes that solar radiation, wind and humidity observations must be used in combination with the frigorimetric observations to give an integrated quantitative estimate of cooling effect on man or material. *Subject Headings:* **Cooling power, Davos frigorimeter, Switzerland, Alps.**—*M.R.*

10–85 551.521.1

†*Thams, Chr., **Die Strahlung von Sonne+Himmel in Zürich.** [Radiation of sun and sky in Zurich.] *Switzerland, Meteorologische Zentralanstalt, Annalen,* **1942.** 10 p. 7 figs., 12 tables, 24 refs. (Reprint available.) **DWB**—Records of global radiation made at Zurich with a Fuess-Robitzsch actinometer, during the period 1938–1942, are used to show the seasonal diurnal and local variations in insolation and the relationship between total radiation received on a horizontal surface and cloudiness or duration of sunshine. Results are compared with values obtained at Davos and on the Jungfraujoch. *Subject Headings:* **Global radiation, Zurich.**—*M.R.*

10–86 551.521.1 551.521.3

Falckenberg, G. and Bolz, H. M., **Jahresgang der Einstrahlung für Warnemünde.** [Annual variation of incoming radiation at Warnemünde.] *Zeitschrift für Meteorologie,* 4(3):65–66, March **1950.** 2 figs. **MH-BH**—Hourly or ½-hourly measurements were made continuously (day and night) from April 1, 1947 to March 31, 1948 in Warnemünde of long wave radiation

from the atmosphere and direct and diffuse solar radiation. Annual variation shown in fig. 1, no tables. Fig. 2 gives annual variation of sunshine, cloud, temperature and vapor pressure. *Subject Headings:* **Solar radiation, Warnemünde, Germany.**—*C.E.P B.*

10–87 551.521.12(481)

*Knudsen, Jon, **Die totale Strahlung in Bergen 1943–44.** [Total radiation in Bergen 1943–44.] *Meteorologiske Annaler*, 2(9):279–310, **1947.** 9 figs., 14 tables, 3 refs., append. **DWB**—Continuous measurements of global radiation were made at the Bergen Meteorological Observatory (at Fredricksberg, 60 24′N, 5 19′E) from Feb. 1, 1943 to March 31, 1944. The characteristics of the Robitzsch actinograph and the calibration of the bi-metallic actinometer are discussed at length. Results of observations are then summarized and discussed in detail and illustrated graphically. Finally, a careful analysis is made of the average, extreme and individual measurements for varying conditions. The actual hourly measurements for the whole year are given in the appendix. *Subject Headings:* **Global radiation, Robitzsch actinograph, Actinometers, Bergen, Norway.**—*M.R.*

10–88 551.521.3

Bullrich, Kurt., **Lichtstreuung an Dunst- und Eisteilchen.** [Scattering of light on vapor and ice particles.] *Zeitschrift für Meteorologie*, 3(11–12):335–338, Nov.–Dec. **1949.** 3 tables, 11 refs., 3 equations. **DLC**—Discusses Linke's attempt to determine the extinction coefficient of the air from measurements of light intensity at zenith. Difficulty is the uncertainty of the scattering function, which is very variable with composition of aerosols in atmosphere. The theoretical scatter functions for water, dust and ice and for various angles are set out and compared with various experimental determinations. Those by S. Gunther on the Wendelstein (1800 m.) confirm the abnormal forward scattering due to ice particles. *Subject Headings:* **Scattering, Aerosols.**—*C.E.P.B.*

10–89 551.521.3

van de Hulst, H. C., **Scattering in the atmospheres of the earth and the planets.** (In **Atmospheres of the earth and planets,** Gerard P. Kuiper, (ed.) Chicago, University of Chicago Press, [1949]. p. 49–111. 11 figs., 8 tables, 129 refs., 60 equations.) **DLC**—In this review of the optics of the terrestrial atmosphere the author emphasizes subjects of astronomical interest, as well as the physical properties of the atmosphere. Emphasis is placed upon the clear and hazy atmosphere, and analogous phenomena in the atmospheres of other planets are discussed. The various techniques for the measurement of extinction are described and the causes of extinction are analyzed. Scattering by haze, fog and dust or single scattering by droplets are considered. The theoretical and observational evidence for the origin of the blue daylight sky are presented. Various methods for investigating the higher atmosphere by optical methods are described and the results obtained are evaluated. And the properties of single and multiple scattering in the atmospheres of planets are computed. All calculations are carried through for one wave length. This article contains original work partly based upon the recent advances made in the theory of transfer by Chandrasekhar. *Subject Headings:* **Scattering, Atmospheric optics.**—*I.L.D.*

TEMPERATURE

10–90 551.524.2:551.524.34

*Johansson, Osc. V., **Finlands Sommartemperatur.** [Summer temperature in Finland.] *University of Helsinki, Institute of Meteorology, Papers*, No. 63, **1949.** 39 p. 4 figs., 5 tables, 3 refs. Summary in German, p. 37–39. (Reprint from *Bidrag till Kännedom af Finlands Natur och Folk*, H. 93, No. 2.) **MH-BH**—A detailed treatise in Swedish, covering all aspects of time and space temperature variations, based on records for 143 stations in Finland and long records at stations in Sweden, Russia and elsewhere. An original chart shows mean summer temperature distribution over Finland for the "Normal Period" 1901–1930. Records and data are critically examined for homogeneity, instrumental errors, exposure, reduction to sea level, artificial trends, etc. Then a comprehensive analysis is made with regard to the secular changes for Finland and for individual stations in the Northern Hemisphere. The

maximum summer temperatures which show up at most northern stations some time during the period 1920–1940 are discussed and an attempt made to present an organized picture by means of series of correlated graphs. An explanation on the basis of changes in general circulation is proposed. Evidence indicates that stations in Central Asia and the Volga region had summer minima during late 1930's when those in northwest Europe had maxima. *Subject Headings:* **Temperature variations, Climatic variations, Finland.**—*M.R.*

10–91 551.524.3 551.577.2(436)

Morawetz, S., **Temperaturen und Niederschläge von Graz (47°4′, 15°28′, 1864–1943).** [Temperatures and precipitation for Graz (47°4′, 15°28′, 1864–1943).] *Geographische Gesellschaft, Wien, Mitteilungen*, 91(10-12):230–232, **1949.** tables. **DWB, DLC**—Analysis of 80 year series of records at Graz, showing coldest and warmest, driest and wettest years and a comparison between monthly mean temperature for each decade and month. Longest dry period was 13 months (May 1942 to May 1943) when rainfall was 53% of normal. In 1881–1882, four months had only 19% of normal. *Subject Headings:* **Temperature variations, Precipitation distribution, Graz, Austria.**—*M.R.*

10–92 551.524.3:634.9

Paulsen, Wolfgang, **Die Jahresringbreite der Spessart-Eichen als Problem der Dendroklimatologie.** [The width of annual rings of the Spessart oak as a problem of tree climatology.] *Deutscher Wetterdienst in der US-Zone, Berichte*, No. 12, p. 109–111, **1950.** fig., 2 tables, 4 refs. **MH-BH**—Widths of annual rings of 5–19 oaks (1650–1947) compared with departures of temperature in Central Europe. Most of wood forms in early autumn and the ring-width is positively correlated with temperature anomaly in July and August. *Subject Headings:* **Temperature variations, Dendrochronology.**—*C.E.P.B.*

10–93 551.524.3

*Xanthakis, John, **Relation between the mean monthly air temperatures in the temperate zones.** University of Thessaloniki, Greece, **1948.** 35 p. 8 figs., 5 tables, ref., 6 equations. **MH-BH**—A short monograph presenting the basic data, theory and representative curves obtained by studying the periodicities in mean monthly air temperature with respect to the longitude of the sun for 180 stations in the Northern Hemisphere and 40 stations in the Southern Hemisphere situated in the temperate zone. From analysis of long records (1765–1945) at Vienna, Copenhagen, Edinburgh, Bergen, Rome and New York, the author concludes that there is a periodical change in the values of e (eccentricity) and P (parameter of the ellipse), in respect to the 11-year solar cycle. For the Northern Hemisphere he concludes that the ratio of the mean monthly temperature is given by the radius vector of the ellipse. *Subject Headings:* **Temperature variations, Solar influences.**—*M.R.*

10–94 551.524.33:551.588.2

Sawada, R., **Temperature difference between mountain top and free air.** *Geophysical Magazine, Tokyo*, 21(2):190–198, March **1950.** 7 figs., 21 refs. **MH-BH**—The problem of temperature difference between mountain top and free air is investigated for Mt. Fuji and Mt. Tsukuba. A dynamic mechanism is presented. The dry adiabatic cooling of upslope air along mountain slopes is the principal factor in the development of temperature differences, which are almost directly proportional to wind speed. Water vapor with its release of latent heat on condensation diminishes dynamic cooling. Solar radiation may influence the temperature difference. *Subject Headings:* **Temperature distribution, Orographic effects, Japan.**—*I.L.D.*

10–95 551.524.33:551.521.1

Visser, S. W., **Les taches solaires et la météorologie. III. Les hivers extrêmes.** [Sunspots and meteorology. III. Extreme winters.] *Annales de Géophysique*, 5(1):74–82, Jan. **1949.** 4 figs., tables, 6 refs. Summary in English p. 74. **MH-BH**—A positive correlation exists between standard deviations of 11-year averages of winter temperatures and long periods of solar activity. Long cycles are attained by taking a sliding mean of the relative Zurich numbers for intervals of 11 years. No correlation exists between standard deviations of

winter temperatures and short cycles of solar activity, which are calculated by subtracting observed sunspot numbers from simultaneous 11-year mean values. The long period of solar activity exerts an effect such that in central and western Europe severe winters are most frequent during the descending part of the short period and very mild winters during the ascending part. In eastern United States the effect is reversed. *Subject Headings:* **Abnormal winters, Sunspots.**—*I.L.D.*

10–96 551.508.27:551.524.35:551.590.24

*Langlo, Kaare, **The effects of the solar eclipse of July 1945 on the air temperature and an examination of the lag of a thermometer exposed in a screen.** *Meteorologiske Annaler*, 3(3):59–74, **1949.** 4 figs., 4 tables, 6 refs., 4 equations. **DWB**—The eclipse of July 9, 1945 was total in northern Norway (66°–67°N) and partial (78%) down to 58° in southern Norway. A detailed analysis is made of special observations made at 67 stations during the eclipse to determine the lag in the temperature recorded inside a shelter, in dependence on wind speed, radiative conditions, etc. Above 4m./sec. the lag decreases, and on cloudy days it is less than on sunny. Average depression of thermometer was 2.3°C. at 53 inland stations and 1.6°C. at 14 coastal stations, where wind speeds were twice those inland, on the average. It was estimated that a screen thermometer would lag 0.29°C. behind an outside thermometer if temperature is decreasing constantly 1°C. per hour (with wind speed 2m./sec. and sunshine). With increasing temperature the radiation inside the screen counteracts the lag in the thermometer or may cause a higher temperature inside screen. *Subject Headings:* **Temperature variations, Eclipses, Temperature measurements, Norway.**—*M.R.*

10–97 551.524.36

§Adamov, P. N., **Kholoda na iuge Sibiri i v Irane v ianvare 1949 goda.** [Cold in the south of Siberia and in Iran in January 1949.] *Priroda, Moscow*, 39(2):26–29, Feb. **1950.** 2 figs. **DLC**—During the winter 1948–1949, great temperature anomalies occurred over Europe and Central Asia. Continuous snowstorms and severe freezing occurred over all of Turkistan. The temperature fell to <-30°C. at Chimkent and Alma Ata—the lowest temperatures observed in 20 years. In Iran the snow reached a depth of 1½ m. and temperature fell to −25°C. there and in Turkey. The opposite condition prevailed in the northwest of Russia—the rivers around Leningrad, Novgorod and Pskov freezing and thawing three times. Frequent and lasting thaws were interrupted by short freezes during December and January, and instead of snow, rain fell frequently. From long period records it was determined that similar conditions occurred in 1881–1882, 1924–1925, 1929–1930, 1931–1932 and 1935–1936. The winter of 1948–1949 would stand in third place. A chart of normal pressure and the synoptic chart for January 5, 1949 show the extent of the pressure and temperature anomaly over Eurasia. *Subject Headings:* **Abnormal winters, Iran, Siberia, U.S.S.R.**—*M.R.*

10–98 551.524.37

Courshee, R. J. and Hogg, W. H., **Frequency of wind and radiation frosts.** *Meteorological Magazine, London*, 79(938):235–236, Aug. **1950.** table. **MH-BH**—Courshee considers frequency of frost in England less than stated by W. H. Hogg (*see item* 4–80 in *Meteorological Abstracts and Bibliography*, 1(4), April 1950). Reply by Hogg. *Subject Headings:* **Frost frequencies, Radiation frost, Wind frost.**

FROZEN GROUND

10–99 551.525:536.6

Skeib, G., **Ein Messverfahren zur Bestimmung der Wärmekapazität des Erdbodens mittels konstant beheizter Testkörper.** [An experiment in determining the heat capacity of the ground by means of a constantly heated test body.] *Zeitschrift für Meteorologie*, 4(1–2):32–39, Jan.–Feb. **1950.** 9 figs., table, 5 refs., 30 equations. **MH-BH**—Pt. A, discusses the mathematical theory of heat loss from a cylindrical or spherical body inserted in a conducting medium, deriving expressions for heat conductivity and heat capacity of the medium. A thin graphite rod (radius 1.1 mm., length 12.8 cm.) was inserted horizontally in soil, etc., with a thermo-element in the middle connected to a galvanometer. Pt. B, describes setup and results,

quoted for cement powder, sand nearly dry and saturated and loose humus. *Subject Headings:* **Earth temperatures, Thermodynamics.**—*C.E.P.B.*

10–100 551.525.5:551.578.46:551.588.6

Molchanov, A. A., **Promerzanie i ottaivanie pochvy.** [Freezing and thawing of soil.] *Lesnoe Khoziaistvo, Moscow,* 3(1):27–31, Jan. **1950.** 7 tables. **DLC**—On the basis of some detailed but fragmentary data made by the Institute of Forestry of the Akademiia Nauk, on the temperature of snow and soil at various depths (0 to 60 cm.) at 7, 13 and 19 h. (1945–1948), the author confirms recent ideas about the connection between the character of the snow cover, etc. and the depth of freezing of soil. Determination of depth of freezing cannot be precise when thermometers are used, because the freezing point varies with physical and chemical composition of soil. Heavy lime soils do not freeze even at temperatures much below the usual (−0.1 to −0.5°C.) The speed of spring thawing also varies, the daily mean ranging from a speed of 8 cm. to 0.1 cm. The highest speed occurs in pine forests and the lowest in bare fields. *Subject Headings:* **Snow temperatures, Frozen soil, Forest influences, U.S.S.R.** —*M.R.*

10–101 551.501:551.525.5(02)

Obruchev, V. A. (ed.), **Sbornik instruktsiĭ i programmnykh ukazaniĭ po izucheniu merzlykh gruntov i vechnoĭ merzloty.** [Collection of instructions and a program for the investigation of frozen soil and permafrost.] Moscow, Izdatel'stvo Adademii Nauk, SSSR, **1938.** 272 p. 64 figs., tables, 84 refs., numerous equations. **DLC**—This manual contains articles by 19 authorities, on methods of permafrost observation and investigation both in the field and laboratory. The first (general) part consists of detailed instructions for general observations of soil temperature, subsurface water, ice flows, soil moisture, freezing and thawing of soil, etc. The second (technical) section consists of instructions for investigation of the physico-mechanical properties of frozen ground, in the laboratory and in connection with construction. The third (biological) section contains three articles on the relation of permafrost to forests, to agricultural experiments and to engineering projects. An appendix outlines in detail a program for research and investigation of permafrost in connection with the building of roads, railroads, dams, navigation facilities, industrial development, etc. *Subject Headings:* **Permafrost, Instruction for observers, Manuals, Engineering, U.S.S.R.**—*M.R.*

10–102 551.525.5:67

Sumgin, M. I. and Demchinskiĭ, B., **Oblast' vechnoĭ merzloty.** [The region of permafrost.] Leningrad, Izdatel'stvo Glavsevmorputi, SSSR, **1940.** 237 p. 64 figs., tables, 61 refs. **DLC**—A nontechnical work on the geographical aspects of frozen soil. Especial emphasis is placed on the problems of agriculture, mining, housing, transportation, etc., in the Arctic regions of European and Asiatic U.S.S.R. The warming in the Arctic during the last half century as reflected in the degradation of the permafrost area, is also treated extensively. Changes in soil temperature also give indication of this "warming." A more technical work by the chief author (and others) is given in (*item* 10–103). *Subject Headings:* **Permafrost, Agricultural meteorology, U.S.S.R.**—*M.R.*

10–103 551.525.5(02)

†*Sumgin, M. I., Kachurin, S. P., et al., **Obshchee merzlotovedenie.** [General course in permafrost science.] Moscow, Izdatel'stvo Akademii Nauk, SSSR, **1940.** 339 p. 110 figs., 60 tables, 252 refs. (at end of chapters), numerous equations. **DLC**—A technical work for university students covering all phases of permafrost investigations: mechanical and physical processes of freezing and thawing, climatological and seasonal aspects, variations in soil temperatures (including considerable data for the Soviet Arctic), secular changes in boundary of permafrost area (in Asia and America) and applications to agriculture, engineering and other economic activities. In addition to a great deal of tabular data there are many graphs showing variations in time and space in soil temperature or permafrost, and many interesting illustrative photographs of equipment or research work. History, development and methods of investigation are also treated. *Subject Headings:* **Permafrost, Soil temperatures, Textbooks, U.S.S.R.**—*M.R.*

WIND

TURBULENCE

10–104 551.551:551.588.6

Pasquill, F., **The aerodynamic drag of grassland.** *Royal Society of London, Proceedings, Ser. A*, 202 (1068):143–153, June 22, **1950.** 2 figs., table, 15 refs., 6 equations. **DLC**—Sheppard's drag plate apparatus, designed for use on a concrete surface, has been modified for measuring the aerodynamic drag over grass. The equipment is described and illustrated. Results of measurement over grass with winds of around 5 m./sec. are tabulated for grass 1–5, 5–10 and 10–15 cm. in length. Richardson's number (Ri_{7_5}) is computed for each 10 minute period and velocity profiles shown. Limitations due to presence of observer, lapse rate variations, etc. are mentioned. Limited data give evidence for validity of Reynold's formula for turbulent shearing stress in the ground layer of the atmosphere. Work is an extension of previous work by Sheppard (1947) on artificial drag over concrete and by Sutton (1949) on diffusion in the lower atmosphere. *Subject Headings:* **Turbulence, Aerodynamics, Frictional effects.**—*M.R.*

10–105 551.551:551.501.6

Johannessen, Thor Werner, **Some computations of the atmospheric turbulence.** *Meteorologiske Annaler*, 3(2):14–58, **1949.** 5 figs., 11 tables, 8 refs., 61 equations. **DWB**—A quantitative study of the physical structure and magnitude of turbulence eddies in air streams. The detailed formulas, graphs and computation tables are presented and discussed for eddy stresses and eddy convectivity smoothed over a long period. Calculations may thus be made from hodographs representing the lapse rate or shear in wind and temperature. Vertical and semi-lateral eddy convectivity due to large scale and to frictional turbulence are treated individually. Little is known about the large scale eddies, but enough measurements have been made to approximate a theory of small scale eddies (which, however, are superimposed on the big fellows). *Subject Headings:* **Turbulence, Eddy convectivity, Nomograms.**—*M.R.*

10–106 551.551:551.588.7

Shiotani, M. and Yamamoto, G., **Atmospheric turbulence over the large city—turbulence in the free atmosphere (2nd report).** *Geophysical Magazine, Tokyo*, 21(2):134–147, March **1950.** 10 figs., 6 tables, 10 refs., 7 equations. **MH-BH**—Variations in wind velocity at various elevations were measured with a hot wire anemometer and were recorded with an electromagnetic oscillograph. There were calculated the mean wind velocity, the intensity and scale of turbulence, the spectrum of turbulence and eddy viscosity. The logarithmic law was found to fit the distribution of mean velocity. The intensity of turbulence, while fluctuating considerably, tended to diminish upwards; its frequency distribution was irregular. Both scale of turbulence and eddy viscosity showed high values and irregular frequencies of distribution because of unstable weather. *Subject Headings:* **Turbulence, Artificial influences.**—*I.L.D.*

WIND

10–107 551.553:551.465

Carruthers, J. N. and Lawford, A. L., **Water movements and winds at the Mouse light-vessel, Thames Estuary.** *Weather*, 5(8):278–283, Aug. **1950.** 3 figs. **MH-BH**—Briefly describes a "vertical log" for recording under-surface currents. Results of observations at two points 9 ft. below surface in 1940 are shown in tabular and graphical form, giving total and residual water movement (miles per day) and resultant winds. Relations between wind and net water movement are briefly described *Subject Headings:* **Wind effects, River currents, Hydrography, Potamology.**

10–108 551.553.21

†Lautensach, Hermann, **Der hochsommerliche Monsun in Süd- und Ostasien und auf den angrenzenden Meeren.** [The mid summer monsoon in south and east Asia and neighboring seas.] *Petermanns Geographische Mitteilungen*, 94(1):18–24, **1950.** fig. (fold. in back), 49 refs. **DLC**—A long discussion of the summer monsoon in various parts of east and southeast

Asia (from Kamchatka to Arabia), on the basis of air masses and regions of convergence and divergence, accompanied by a generalized stream line chart of the whole area (showing frontal zones and the influence of the Himalayas). *Subject Headings:* **Monsoon circulation, Orographic effects, Southeast Asia.**—*M.R.*

10–109 551.553.21

†Khromov, S. P., **Musson kak geograficheskaia real'nost'.** [Monsoon as a geographical reality.] *Vsesoiuznoe Geograficheskoe Obshchestvo, SSSR, Izvestiia*, 82(3):225–246, May–June, **1950.** map, 23 refs. **DLC**—A long and detailed discussion (without data) of the monsoons in various parts of the earth, based on pressure distribution rather than on wind data (which the author believes to be too much influenced by other factors). A chart of the various degrees of monsoon presistence is presented for the entire earth, based on zones of relative frequency (<40%, 40–60% and >60%) of gradient winds from one quarter of the compass or from the exact opposite quarter. Pertinent works of many authors (1884–1948) are referred to and discussed. *Subject Headings:* **Monsoons, Gradient winds.**—*M.R.*

10–110 551.555

§Koch, H. G., **Über Winde und Wetterlagen in Südsardinien.** [On winds and weather conditions in south Sardinia.] (In his **Meteorologische Studien im Mittelmeer.** *Germany, Meteorologischer Dienst der Deutschen Demokratischen Republik, Abhandlungen*, No. 1:41–66, **1950.** 7 figs., numerous tables, 3 refs.) **DWB**—The climate of Sardinia is characterized by a very unhealthy, hot summer and a long winter with strong winds and frequent rain. The study consists of a detailed analysis of synoptic conditions, upper air and surface winds and weather; demonstrating how the land-sea breeze circulation, reinforced by mountain-valley winds, increases the amount of precipitation and produces a secondary maximum of thunderstorms and showers in the latter part of the night. The dynamic formation of inversions and local vortices is a peculiarity of the climate. Special features, such as fog, sirocco winds and northwest gales in the Straits of Sardinia are treated from a synoptic point of view. *Subject Headings:* **Synoptic climatology, Winds, Sardinia.**—*M.R.*

10–111 551.555

*§Koch, H. G., **Über die Aerologie der Etesien des östlichen Mittelmeeres im Sommer 1942.** [Aerology of the etesian winds in the eastern Mediterranean in the summer of 1942.] (In his **Meteorologische Studien im Mittelmeer.** *Germany, Meteorologischer Dienst der Deutschen Demokratischen Republik, Abhandlungen*, No. 1:7–39, **1950.** 17 figs., 19 tables, 7 refs.) **DWB**—A number of different types of weather situations favorable for the etesian (strong north or northwest winds) in the region of Greece and the Aegean Sea, are studied in detail with respect to the synoptic and aerological conditions prevalent at the time. The cross sections, adiabatic diagrams of soundings etc., are based on radiosonde ascents made in 1942 at Athens, Salonika, Rhodes, Khania (Crete), Derna and El Daba (airplane ascents). Considerable data on the depth of the intruding cold air mass, the tropopause and on thermodynamic changes, are given. A chapter on the aerological and thermodynamic conditions attending cumulus or stratus formations along the coasts of the Mediterranean, is based mainly on ascents of El Daba and Derna. *Subject Headings:* **Synoptic-aerological studies, Cloud forecasting, Etesian winds, Greece, Aegean Sea, Mediterranean.**—*M.R.*

10–112 551.555.6(77)

§Hovde, M. R., Lamoureux, C. E., and Thompson, H. J., **Reports of the Great Plains windstorm—May 5–6, 1950.** *Weatherwise*, 3(3):62–63, June **1950.** 4 charts. **MH-BH**—Details including daily synoptic charts for North America (May 4, 5, and 6, 1950) presented. *Subject Headings:* **Wind storms, Wind damage, Great Plains.**—*M.R.*

10–113 551.555.8

§Lunson, E. A., **Sandstorms on the northern coasts of Libya and Egypt.** London, H. M. Stationery Office, **1950.** 12 p. 8 figs. (*Great Britain, Meteorological Office, Professional Notes*, No. 102.) At head of title M.O. 524 b. **MH-BH**—The worst sandstorms occur be-

tween October and early June at fronts in "khamsin" depressions traversing north coast of Africa. The general characteristics and effect on airfields are described in Pt. I. In Pt. II the khamsin depression of March 23–25, 1942, is analyzed with synoptic charts, thermograms and hygrograms. *Subject Headings:* **Sandstorms, Khamsin, Libya, Egypt.**

10–114 551.555.9:551.556.1:551.311.128

Gvinchidze, N. M., **Vozdushnye techeniia voznikaiushchie pri dvizhenii snezhnykh lavin.** [Air streams initiated by the movement of snow avalanches.] *Priroda, Moscow,* 39(6):67–69, June **1950.** 4 figs., 8 refs. **DLC**—A note on the damage done to forests and buildings by the air wave which follows an avalanche. Extent and depth of wave, and intensity under the most severe conditions estimated. Methods of protection against avalanches in U.S.S.R. and Switzerland are cited and illustrated. *Subject Headings:* **Avalanche winds, Wind damage, U.S.S.R.**—*M.R.*

UPPER AIR WINDS

10–115 551.557:551.588.2

Penndorf, Rudolf, **Die Höhenströmung über dem Karpatenvorland bei Ostwinden.** [Upper current over the Carpathian foreland with east winds.] *Zeitschrift für Meteorologie,* 3(10):293–297, Oct. **1949.** 4 figs., 3 tables, 9 equations. **DLC**—The effect of topography on air currents is well-shown north of Carpathians, where east winds are deflected northwards. In four years 50 cases were found with maximum speed 1000 meters above M.S.L. Wind vectors at different heights above Cracow are shown. When speed at 2000 m. exceeds 10 m./sec. this maximum disappears owing to turbulence. The effect is discussed theoretically and it is found that the maximum at 1000 m. can only occur with laminar flow. *Subject Headings:* **Upper air winds, Orographic effects, Carpathians.**—*C.E.P.B.*

10–116 551.557:551.513

Venkiteshwaran, S. P., **Winds at 10 kms. and above over India and its neighbourhood.** *National Institute of Sciences of India, Proceedings,* 16(1):19–27, Jan.–Feb. **1950.** 7 figs., 5 refs. **DSI**—A graphic and descriptive summary of all available wind data for the period 1920–1941 for levels above 8 km. Charts for every 2 km. (10–20 km.) show the general circulation during the winter (westerlies) and the monsoon season (easterlies). Flow during the two seasons agrees with that predicted by Bjerknes from charts of upper air pressure. Vertical structure of wind in five different regions of India is shown for the two seasons. Zonal component (*jet stream*) is shown graphically for 0–20 km. and 60°N to 10°S. Charts showing direction and speed of flow for four seasons as taken from movement of high clouds are also presented. *Subject Headings:* **Upper air winds, Zonal circulation, India.**—*M.R.*

10–117 551.557.36 551.587 551.501.7

†Brooks, C. E. P., Durst, C. S., Carruthers, N., and others, **Upper winds over the world.** London, H. M. Stationery Office, **1950.** 149 p. 19 figs., 60 charts, 33 tables, 74 classified references to upper air data. (Great Britain, Meteorological Office, *Geophysical Memoirs,* No. 85.) **MH-BH**—Describes a method of constructing roses of wind speed and direction for any place at any height up to 40,000 ft. In the free air the distribution of winds approximates the normal circular distribution about the vector mean wind. Hence, a wind rose can be constructed if vector mean and vector standard deviation are known. Outside tropics, vector mean can be found from distance apart of lines of equal height of isobaric surfaces. Pt. II, gives world charts of mean heights of 700, 500, 300, 200 and 130 mb. surfaces for four seasons, with an account of method of construction. Pt. III, gives charts of standard vector deviation for same levels and seasons. Between 25°N and 25°S the geostrophic relation does not hold and for these regions seasonal charts of stream lines and mean vector speed are given. Appendices describe use of pilot balloon observations in construction of wind roses and give tables for constructing roses from vector mean and standard deviation. *Subject Headings:* **Upper air winds, Wind roses, Upper air observations.**

AQUEOUS VAPOR AND HYDROMETEORS

WATER VAPOR, FOG AND CLOUDS

10–118 551.574

Köhler, Hilding, **On the problem of condensation in the atmosphere.** *Uppsala, K. Universitetet, Meteorologiska Institutionen, Meddelande,* No. 15, **1950.** 76 p. 16 figs., 10 tables, 15 refs., 49 equations. (*Nova Acta Regiae Societatis Scientiarum Upsalensis,* Ser. 4, Vol. 14, No. 9, 1950.) **MH-BH**—This important monograph represents the substance of a course in the physics of drop formation given by the author for several years at the Meteorological Institute of the Royal University at Uppsala. The lectures were meant to serve as the theoretical basis of planned experimental investigations. The paper presents systematically the kinetic and thermodynamical theory of drop formation in the free atmosphere, and is supported by numerous empirical nomograms, calculation tables and formulas based on the classical works of the author himself (who began his investigations in 1914) and of J. Frenkel, H. Weickmann, Max Volmer, J. W. Gibbs, Fournier d'Albe and Findeisen. Among other subjects treated are: historical development of present theory; Gibbs' investigations to show how droplets can form without condensation nuclei; the probability of formation of a droplet; computation of equilibrium curves; (a) equilibrium and (b) energy necessary for formation of a droplet, (1) without and (2) with a condensation nucleus, respectively; equilibrium conditions for a system of droplets and vapor; nonhygroscopic condensation nuclei; the kinetics of condensation; supercooling; the equilibrium curve of droplets of pure water and of sea salt solutions, respectively; numerical calculations (including curves and tables) of number of condensation nuclei N, vapor pressure, concentration of droplets, energy relations, mass and density of nuclei and droplets, etc. Application to formation of ground fog and to a lesser extent of clouds and ice. Appendix I, contains detailed data on: (1) density of sea water, (2) of water in solution and (3) surface tension; Appendix II, computation of $A_{s(mi)}$ and Appendix III, computation of M_a and I. *Subject Headings:* **Condensation, Cloud physics, Condensation nuclei.**—*M.R.*

10–119 551.575:551.521.63

Miyake, Y. and Saruhashi, K., **The estimation of the height of fog by observing the ultraviolet solar radiation.** *Geophysical Magazine, Tokyo,* 21(2):122-125, March **1950.** 4 figs., table, 5 refs., 2 equations. **MH-BH**—The relationship between ultraviolet radiation and the height of fog is investigated by a method that involves the photochemical reaction of ultraviolet rays with leucobase of crystal violet. Ultraviolet radiation is diminished by fog and a high negative correlation exists between height of fog and intensity of ultraviolet radiation. An empirical equation expressing the relationship between the height of fog and intensity of radiation is presented. *Subject Headings:* **Fog depth, Ultraviolet light.**—*I.L.D.*

10–120 551.575:551.578.46(481)

*Spinnangr, Gunnar, **On fog over snow-covered ground in Finnmarksvidda (North-Norway).** *Meteorologiske Annaler,* 3(1):1–12, **1948.** 3 figs., 3 tables, 4 refs., equation. **DWB**—An analytical study of fog frequency, duration and characteristics, based on data for 1935–1939 at Karasjok, Kautikeino and Karesuando (on a plateau in northern Norway and Sweden). Frequencies at various temperatures are compared with data for Oslo (1920–1931) and for 10 Siberian lowland stations, as well as later data for northern Norway. Synoptic conditions, relative humidity with respect to ice and to water, change of state at extremely low temperatures, effect of snow cover on duration and dissipation of water and ice fogs and effect of wind and frontal passages are all considered and conclusions supported by graphs and scatter diagrams. *Subject Headings:* **Fog frequencies, Fog forecasting, Snow cover effects, Scandinavia.**—*M.R.*

10–121 551.575.1:551.510.42

†Ertel, Hans, **Über die Akkumulation von Chlor-Ionen in driftenden Meernebeln.** [On the accumulation of chlorine ions in drifting sea fog.] *Zeitschrift für Meteorologie,* 1(7):213–215, April **1947.** bibliog. **DWB**—*Subject Headings:* **Fog, Aerosols, Condensation nuclei.**

10–122 551.576:77

Cox, Robert E., **Cloud photography.** *Weatherwise*, 3(3):51–55, June **1950.** 5 cloud photos. **MH-BH**—Technical details for the camera enthusiast or meteorologist who wishes to take good cloud pictures. Type of film, exposure and developing techniques outlined. *Subject Heading:* **Cloud photography.**—*M.R.*

10–123 551.576.1

Rassow, L., **Auffallende Quellwolkenbildung an der Ostseeküste.** [Remarkable convective cloud on the Baltic Coast.] *Zeitschrift für Meteorologie*, 4(3):85–86, March **1950.** fig. **MH-BH**—Aug. 20, 1944 near Zingst. The sketch shows a regular cellular structure indicating a local circulation. *Subject Headings:* **Cloud structure, Baltic Coast.**—*C.E.P.B.*

10–124 551.576.1

Malkus, Joanne Starr, **The birth and death of a cumulus.** *Weatherwise*, 3(3):56–59, June **1950.** 2 figs., 3 cloud photos. **MH-BH**—A semi-technical article based on studies made at Woods Hole, Mass., on the effects of convection, turbulence, wind-shear, thermals, etc. in the development and life history of cumulus clouds. *Subject Headings:* **Cloud formation. Cumulus clouds.**—*M.R.*

10–125 551.576.1/4 551.55

*Rossi, Veikko, **Untersuchungen über die Wolken nach meteorologischen und aerologischen Beobachtungen in Utti 1932–1939.** [Investigations of clouds according to meteorological and aerological observations in Utti 1932–1939.] *Finland, Ilmatieteellisen Keskuslaitoksen toimituksia*, No. 32, **1948.** 46 p. 32 tables, 21 refs. **MH-BH**—A statistical study of cloud amount and cloud height at the aerological station of Utti, Finland, based on detailed observations made during the period 1932–1939, by eye, by airplane ascent and by pilot balloon (theodolite). The frequency of total cloud amount for each tenth of sky cover (0–10) and for each month, is compared for the three types of observation. The same comparison is made for frequency of cloud types, the height of clouds, the thickness of various types of cloud layers and of all types (by seasons). The last portion summarizes observations of turbulence and cloud type frequency made during airplane and radiosonde ascents. Seasonal frequencies at various heights, average depth of turbulent layer (surface and aloft), frequency of cloud and turbulence by air mass type and physics of turbulence, cloud and rain formation are discussed and the text supported by a wealth of analytical and integrated data. *Subject Headings:* **Cloud structure, Cloud height, Cloud frequencies, Turbulence.**—*M.R.*

10–126 551.576.12:

Badt, Kurt, **John Constable's clouds.** (Trans. from German by Stanley Godman.) London, Routledge and Kegan Paul, **1950.** 102 p. 8 photos. **MH-BH**—The book opens with the history of the use of clouds in painting; no early artist had studied cloud forms. Knowledge of clouds was introduced by Goethe's cloud poems (quoted in full with translation) based on work of Luke Howard. The Norwegian J. C. C. Dahl was the only artist to adopt Goethe's suggestions directly, he painted numerous cloud studies (four shown). He was followed by K. F. Blechen (two examples). J. Constable's early clouds are unnatural; in 1821–1822 he made about 50 special cloud studies. The latter are based on Howard's sketches (three reproduced) and classification of clouds published in his **"Climate of London"** 1818–1820. These studies and subsequent paintings are analyzed and described as meteorologically accurate and dynamically reflecting the changing English skies. Other influences include T. L. M. Forster and Gilbert White, naturalists. Chapters IX and X discuss the parallelism of Constable's art and Wordsworth's nature poetry. Six of Constable's cloud pictures reproduced. *Subject Headings:* **Clouds, Art.**—*C.E.P.B.*

RAIN

10–127 551.577.

*Thams, Chr., **Ergebnisse zehnjähriger Niederschlagsregistrierungen in Locarno-Monti.** [Results of 10-year records of precipitation in Locarno-Monti.] *Wasser- und Energie*

wirtschaft, Zurich, 3(4–5), **1948.** 16 p. 6 figs., 24 tables, 9 refs. (Reprint available.) **DWB**—A detailed statistical analysis of the diurnal, seasonal and annual variations in amount, intensity, duration and frequency of precipitation, as recorded by a Hellmann recording rain gage at the Ticinese Observatory near Locarno. The material is summarized and interpreted in every possible way. Data on cloudbursts are given special treatment from the hydrometeorological point of view. *Subject Headings:* **Precipitation frequency, Rainfall extremes, Locarno, Switzerland.**—*M.R.*

10–128 551.577.36

†*Uttinger, H., **Die Niederschlagsverhältnisse der Südschweiz. (Tessin und Misox) 1901–1940.** [Conditions of precipitation in south Switzerland. (Tessin and Misox) 1901–1940.] *Switzerland, Meteorologische Zentralanstalt, Annalen*, p. 1–15, **1945.** 3 figs., 10+tables, 36 refs., equations. (Reprint available.) **DWB**—A detailed and critical analysis of time and space variations in monthly and annual precipitation, snow cover and number of days with precipitation in the southern part of Switzerland. This region is divided into three zones: the dry southwest Border Zone (<200 cm.), the Central Mountain Zone and the High Alps (>300 cm.). Places in rain shadows are often exceptionally dry (Comprovasco 136 cm./year). A section is devoted to droughts and detailed frequency of wet and dry periods of various duration (Lugano). *Subject Headings:* **Precipitation variations, Drought frequency, Switzerland.**—*M.R.*

10–129 551.577.5

*Bova, N. V., **Osadki vysokikh beregov rek.** [Precipitation on the high bank of a river.] *Vsesoiuznoe Geograficheskoe Obshchestvo, SSSR, Izvestiia*, 82(1):92–94, Jan.–Feb. **1950.** 5 tables, 4 refs. **DLC**—On the basis of 20 years of precipitation data (1929–1948) for Saratov, the author concludes that the amount and the number of days with precipitation is greater by 50–100 mm. per year on the higher than on the lower bank of the Volga—the difference being greatest in the warm season of the year. Only two years out of the 20 (1930 and 1944) showed a reversal of the normal condition. The author concludes that the difference is due to elevation and not to the influence of the Volga River. *Subject Headings:* **Topographic effects, Precipitation distribution, Volga, U.S.S.R.**—*M.R.*

10–130 551.577.51

Schirmer, Hans, **Luv- und Leegebiete im Nordwestdeutschen Flachland.** [Windward and leeward regions in the northwest German plains.] *Meteorologische Rundschau*, 2(3–4):91–92, March–April **1949.** fig., 7 refs. **MH-BH**—In spite of the small variations in level of the land, the annual rainfall in a number of lowland areas shows appreciable variation from place to place, which are illustrated cartographically. *Subject Headings:* **Rainfall variations, Topographic effects, Northwest Germany.**—*C.E.P.B.*

10–131 551.577.51

Spinnangr, Finn and Eide, Odd, **On the measurement of precipitation. II. Lista Meteorological Station.** *Meteorologiske Annaler*, 2(8):263–278, **1947.** 2 figs., 7 tables, 3 refs. **DWB**—A previous paper (*ibid.*, Bd. 2, Nr. 5, 1945) took up the exposure of rain and snow gages at Fanaråken Observatory. This paper does the same for the station *Lista* (58°6′N, 6°34′E) which is located on a headland or small peninsula. Several sites were selected E, S, W and N of a fixed gage, and measurements made for one year (1944–1945). Daily measurements at the five stations are tabulated and summarized, and an analysis made of comparative catch at the several stations with various prevailing winds. Stations in the lee of the headland always got more precipitation than those on the windward slope, but the mean annual amounts at the four stations differed only slightly from that at the fixed gage. Effect of buildings noticeable when in close proximity to gages. A shielded (Nipher) gage was used for one year near the fixed gage, catching 105% (more) rain and 186% (more) snow than the unshielded gage; and the catch was the greater, the greater the wind speed. *Subject Headings:* **Precipitation measurements, Shielded snow gages, Lista, Norway.**—*M.R.*

10–132 551.578.1

Imai, I., **On the velocity of falling raindrops.** *Geophysical Magazine, Tokyo,* 21(3):244–249, March **1950.** 3 figs., table, 9 refs., 14 equations. **MH-BH**—This is a theoretical discussion of the deformation undergone by a raindrop falling through space and of the effect of deformation upon its velocity. Theoretically calculated values for fall velocity agree with measurements on raindrops with diameter less than 2 mm. *Subject Heading:* **Raindrop velocities.**—*I.L.D.*

10–133 551.578.1

Kinshott, E. J., **Unusual fall of rain at Upavon on November 4, 1949.** *Meteorological Magazine, London,* 79(937):205–206, July **1950.** fig. **MH-BH**—Rain (not drizzle) from stratocumulus due to coalescence of small water drops. *Subject Headings:* **Rain formation, Upavon, England.**

10–134 551.578.11

Best, A. C., **Empirical formulae for the terminal velocity of water drops falling through the atmosphere.** *Royal Meteorological Society, Quarterly Journal,* 76(329):302–311, July **1950.** fig., 6 tables, 7 refs., 9 equations. **MH-BH**—Using unpublished data by C. N. Davies, author represents terminal velocities of drops falling through a standard atmosphere by the expression $V=A \exp bz \{1-\exp [-(d/a)^n]\}$ with constants:

Range of d	I.C.A.N. atmosphere				Summer tropical atmosphere			
mm.	A	b	a	n	A	b	a	n
0.3 –6.0	932	.0405	1.77	1.147	958	.0354	1.77	1.147
0.05–0.3	191	.0290	0.316	1.754	188	.0256	0.304	1.819

For drops of diameter less than 0.05 mm., Stokes' law applies. Some calculated values are given and errors estimated. *Subject Heading:* **Raindrop velocities.**

10–135 551.578.1

Johnson, John C., **Measurement of the surface temperature of evaporating water drops.** *Journal of Applied Physics,* 21(1):22–23, Jan. **1950.** 3 figs., table, 4 refs., 7 equations. **DLC**—Drops are suspended from small thermocouples in chambers where temperature and humidity can be controlled. Different thermocouples have different heat loss characteristics but if several couples are used, the resulting curves can be extrapolated to a common O heat loss. Final results agree with Fuchs' theory. *Subject Headings:* **Raindrop temperature measurements, Evaporation, Thermocouples.**—*M.R.*

10–136 551.578.11:545.3

Ricard, Mlle Y., **Recherche polarographique d'alcalius dans l'eau de pluie.** [Polarigraphic research on alkalinity of rain water.] *Journal Scientifique de la Météorologie,* 2(6):50–55, April–June **1950.** 7 figs., 2 refs., equation. Summaries in French, English and Spanish p. 50. **MH-BH**—A method is described and the equipment illustrated for testing the amount of sodium and potassium in rain water when the concentrations of salts are very dilute. An amount of alkaline electrolyte 50 to 100 times as great as that in the sample, is introduced into the solution in order to suppress the "current migration" so that only the "diffusion current" is registered in the polarigraph. The usual method shows a combination of the two currents and does not give the true analysis. *Subject Headings:* **Rain water analysis, Salinity determination.**—*M.R.*

SNOW

10–137 551.578.

Zamorskiĭ, A. D., **Krupneĭshiĭ snezhnyĭ grad.** [The biggest snow pellets.] *Priroda, Moscow,* 39(5):49–51, May **1950.** 3 figs., 10 refs. **DLC**—Details of the unusually large (1 mm.) graupel which fell on Oct. 28, 1949 (near Leningrad). Other such occurrences are cited and the physics of the formation of snow pellets discussed. Largest previous pellets measured

10–12 mm. (in Smolensk, 1927). Synoptic conditions are described (secondary maritime arctic air coming across Norway at the rear of a deep cyclone, shower clouds and deep, moist, unstable air over Leningrad). The conical pellets which are illustrated fell only in a narrow strip in the northern part of the city. *Subject Headings:* **Graupel, Snow, Leningrad, U.S.S.R.**—*M.R.*

10–138 551.578.45

Müller, Ingeborg, **Die grossen Schneefälle im Erzgebirge im Spätwinter 1944.** [The great snowfalls in the Erzgebirge in the late winter of 1944.] *Zeitschrift für Meteorologie*, 4(3):81–85, March **1950.** 3 figs., 2 tables, 3 refs. **MH-BH**—The extraordinary depth of snowfall between Feb. 4 and March 23 (exceeding 250 cm. locally) is attributed to the Vb weather type with high level trough over central Europe and instability and northwest blocking over Erzgebirge. Great snowdrifts interrupted traffic until April 10. *Subject Headings:* **Snowfall extremes, Erz Mountains, Germany.**

10–139 551.578.45

§**Snowstorm during the night of April 25–26, 1950.** *Meteorological Magazine, London*, 79(938):224–231, Aug. **1950.** 4 figs., 5 photos, 4 tables. **MH-BH**—Describes storm of wet snow with gales in England south of Thames. Maps of depth of snow and 24-hour rainfall given. Many trees and telephone poles and wires were damaged. Caused by depression in cold polar air in English Channel in a steep horizontal temperature gradient; synoptic chart and chart of thickness lines and thermal winds 1000–500 mb. shown and characteristics of polar air depressions discussed. *Subject Headings:* **Snowstorms, Snow damage, England.**

10–140 551.578.45 551.577.53

Stranz, D., **Auslösung von Schneefall über einer Grosstadt.** [Release of snowfall over a large city.] *Zeitschrift für Meteorologie*, 3(11–12):359–360, Nov.–Dec. **1949.** fig. **DLC**—On March 1, 1949 a depression brought widespread precipitation over south Sweden and an isolated patch of snow of 5 km. radius at Göteborg. This was due to a small disturbance initiated in air in adiabatic equilibrium by the heat of the town. The disturbance affected field strength of microradio waves. *Subject Headings:* **Snowstorms, Artificial influences, Göteborg, Sweden.**—*C.E.P.B.*

10–141 551.578.46

Dolgushin, L., **Nekotorye nabliudeniia nad snegovym pokrovom v severnoĭ chasti srednego Urala zimoĭ 1939 g.** [Some observations on snow cover in the northern part of the middle Urals in the winter of 1939.] *Problemy Fizicheskoĭ Geografii*, 9:101–105, **1940.** 6 figs., table. **DLC**—About the first of February 1939 a party on skis made a snow survey, crossing the Urals along the parallel 59°30′N. A snow depth profile and profile of the relief shows the relation of snow depth to elevation or exposure along this 100 km. course. The deepest snow was on the west side of a pass (near Molchan) at an elevation of 580 m. The author estimates that snow depth increases with altitude at a rate of about 17 cm./100 m. Snow density measurements are also reported. Photos show the character of the snow cover at five different points. *Subject Headings:* **Snow cover, Snow surveys, Urals, U.S.S.R.**—*M.R.*

10–142 551.578.46

*Simojoki, Heiki, **Über den Zeitpunkt des Entstehens und des Verschwindens der dauernden Schneedecke in Finnland.** [The date of appearance and disappearance of snow cover in Finland.] *University of Helsinki, Institute of Meteorology, Papers*, No. 59, **1947.** 31 p. 9 figs., 3 maps, 5 tables, 18 refs. (Reprint from *Fennia* 70, No. 3.) **MH-BH**—Detailed statistics on the time of first and last occurrence of an enduring snow cover are analyzed carefully and presented in numerous charts, tables and histograms. Discussion of the difference between wooded and unsheltered areas with respect to duration of snow cover, supportee by isochronal charts of all Finland (5 day intervals using average data 1892–1941). *Subject Headings:* **Snow cover, Finland.**—*M.R.*

10–143 551.578.46:551.579.2

*Verner, A. P. and Verner, M. F., **Temperatura i vlazhnost' pochvy pri snegozaderzhanii v usloviiakh tsentral'noĭ Baraby.** [Temperature and wetness of soil with snow preservation in conditions of central Baraba.] *Akademiia Nauk, SSSR, Pochvovedenie*, No. 6, p. 340–353, **1950.** 3 figs., 10 tables, 10 refs. **DLC**—Detailed presentation of results of experiments on the temperature and moisture of soil with varying conditions of artificial *snow retention*. These experiments were made at the Ubinskaia Experimental-Conservation Station in western Siberia. The influence of varying degrees of snow accumulation during the winter and spring on the soil temperature in the vegetative period and on the harvest of grain is also investigated. A great deal of data are presented in tables and graphs, but the author recommends that further controlled experiments be made to determine the exact benefits to be derived from snow retention. *Subject Headings:* **Snow retention, Soil temperatures, Soil moisture, Western Siberia, U.S.S.R.**—*M.R.*

10–144 551.578.46:551.311.121(47)

Zykov, I. V., **Snezhnik na gore Bol'shoĭ Taskyl v Kuznetskom Alatau.** [Snow accumulation on the mountain Bolshoi Taskyl in Kuznetsk Alatau.] *Priroda, Moscow*, 39(6):65–67, June **1950.** 2 figs., 4 refs. **DLC**—Account of the beginning of a glacier (firn) in summer 1948, which was studied in detail by the author. Elevation 1300 m. above sea level. *Subject Headings:* **Snow cover, Firn, Kuznetsk Alatau, U.S.S.R.**—*M.R.*

HYDROMETEOROLOGY

10–145 551.509.3:551.579

Coutagne, M., **Quelques considérations générales sur la nature, les possibilités et les modalités des prévisions en hydrologie fluviale.** [Some general considerations on the nature, possibilities and methods of forecasts on river hydrology.] *Annuaire Hydrologique de la France 1948*, Paris, Société Hydrotechnique de France, p. 13–36, [**1949**]. 11 figs., 6 refs., equations. (Reprint available.) **DWB**—The theoretical basis of statistical forecasting as applied to runoff or stream flow, is discussed at length, followed by an elaboration of several methods employed in various countries; and especially the methods employed for long range river forecasting in France and North Africa. Illustrations show how correlations between successive months, periodicities, curves of probability, and physical correlations can be used separately or in combination to give reliable forecasts for some months ahead. *Subject Headings:* **Hydrologic forecasting, France, North Africa.**—*M.R.*

10–146 551.579:551.508.79(02)

Forschungsanstalt für Gewässerkunde, **Vorläufige Richtlinien für die Errichtung von Pegelanlagen.** [Provisional rules for establishment of water gage installations.] Bielefeld, **1949.** 47 p. 21 figs. (in append.). **DWB**—*Subject Headings:* **Hydrology, Water level recorders, Manuals.**

10–147 551.508:551.579:551.501.9

*Austria. Hydrographischer Dienst, **Die Pegel in Österreich 1893–1945.** [The water gages in Austria 1893–1945.] Vienna, Hydrographisches Zentralbüro, **1947.** 204 p. append. **DLC**—Description of location and length of record at 987 river gage stations operated during the past century in Austria. *Subject Headings:* **River gages, Observational networks, Austria.** —*M.R.*

10–148 551.579(02)

†Kuenen, Philip Henry, **De kringloop van het water.** [The hydrologic cycle.] The Hague, H. P. Leopolds Uitgevers-Maatschappij, **1948.** 397 p. 210 figs., 16 plates, glossary, classified biblio. **DLC**—This handsome textbook (in Dutch) takes up the science of hydrology from the point of view of the geologist or geographer, rather than (as in most American texts) from the engineering or hydrological forecasting standpoint. The short first chapter on water and the hydrologic cycle is followed by one of about 100 pages on oceanography and hydrography; two shorter chapters on water in the atmosphere, and on solid water (snow, ice and

glaciers), respectively; two longer chapters on ground water and on surface waters, (rivers, lakes, waterfalls); and a short final chapter on the water balance of the earth. A three-page glossary of Dutch terms and a three-page classified bibliography are appended. Many original schematic diagrams are included, as well as some unusual photographs. *Subject Headings:* **Hydrology, Hydrologic cycle, Hydrography, Textbooks.**—*M.R.*

10–149 551.579

Sekiguchi, T., **Climatological water balance problem in Japan.** *Geophysical Magazine, Tokyo*, 21(2):177–189, March **1950.** 15 figs., 4 tables, 2 refs. **MH-BH**—The climate of Japan is analyzed by means of C. W. Thornthwaite's concept of potential evapotranspiration. A comparison is made between potential evapotranspiration values and actual values obtained with an atmometer. Maps illustrate the geographical distribution of annual and monthly potential evapotranspiration, of water surplus and deficit regions and of amounts of water storage change, and the geographical distribution of annual moisture ratio. The distribution of water surplus and deficit areas corresponds very closely to regions characterized by wetness and drought, respectively. *Subject Headings:* **Evapotranspiration, Hydrologic cycle, Climatic classification, Japan.**—*I.L.D.*

10–150 551.579(02)

†Wisler, Chester Owen and Brater, E. F., **Hydrology.** New York, John Wiley, [1949]. 419 p. 132 figs. (incl. maps), 29 tables, 77+refs., equations. **DLC**—This is a comprehensive textbook intended primarily for engineering students. The book begins with a discussion of the hydrograph. The subsequent chapters cover the following topics: drainage basin, precipitation, water loss, infiltration, ground water, runoff, floods and stream flow records. The chapter on ground water is written by John S. Ferris and contains an extensive bibliography. Many useful nomograms and computation tables are included. The meteorological aspects are thoroughly treated in a quantitative manner. *Subject Headings:* **Hydrology, Nomograms, Textbooks.**—*M.R.*

10–151 551.579.5

Göhre, K., **Über den Durchfluss des Sickerwassers. (Nach Messungen in Eberswalde.)** [On infiltration of seepage water. (According to measurements in Eberswalde.)] *Zeitschrift für Meteorologie*, 3(11–12):352–356, Nov.–Dec. **1949.** fig., 10 tables, 4 refs. **DLC**—At Eberswalde three sunk boxes of 1 sq. meter surface, 1.5 m. deep, were supported on balances and filled with sandy soil; (1) was left bare, (2) grass covered, (3) planted with pine. In 1930–1937 mean annual rainfall was 615 mm., percolation in (1) was 484, in (2) 259 and in (3) 149 mm. Details of effect of daily rainfall show maximum percolation on day following heavy rain on wet soil. Speed flow calculated as 1.5 cm. day. *Subject Headings:* **Percolation, Eberswalde, Germany.**—*C.E.P.B.*

CLIMATOLOGY AND BIOCLIMATOLOGY

CLIMATOLOGY

10–152 551.582(47)

†Berg, Lev Semenovich, **Natural regions of the U.S.S.R.** New York, MacMillan Co., **1950.** Price $10.00. 436 p. 81 figs., 23 maps, translit. table, 30 tables, 41+refs., index of plants, index of animals, glossary. (Translated from *Priroda*, *Moscow* by Mrs. Olga Adler Titelbaum. Classified biblio. p. xxiii–xxiiv.) **DLC**—A fundamental text on the physical geography of the U.S.S.R. by an outstanding scientist who has been considered an authority for over 50 years; first publishing treatises in ichthyology (1895), later in oceanography (studied at Bergen in 1902), limnology, climatic change (1905), loess and sand (1907), geomorphology (1913) and later works in hydrography, meteorology, glaciology, biogeography, climatology (1926) and history of geographical explorations (1920–1929)—in all he has published over 480 articles or books. Many of the numerous illustrations, although excellent, are not from the original text, but from a German work **Vegetationsbilder.** The vast territory of the U.S.S.R. is broken down into twenty natural regions, each of which is treated in a separate chapter: the

tundra, the taiga, the forest steppe, the steppe, the semidesert, the desert zone, the humid subtropics, the mountain regions of various sections, Lake Baikal, Trans Baikal, Amur Basin, Sakhalin, Kamchatka, etc. Appended is a bibliography, glossary, an index of plants and one of animals and a general index. Each chapter contains much on the climate and weather of the particular region. In addition, of the 30 tables, 25 contain climatic data (temperature, precipitation, humidity, wind, snow line, cloudiness, etc.) for specific places. Then there are eight climatic charts of the U.S.S.R., showing isolines of average temperature, cloudiness, precipitation and snow cover. The discussion of climate and weather is based on a great deal of actual experience in the regions, and is analytical as well as descriptive. Review by Joseph E. Williams in *Science*, 112(2907):317–318, Sept. 15, 1950. *Subject Headings:* **Climatology, Climatic zones, Physiography, L. S. Berg, U.S.S.R.**—*M.R.*

10–153 551.582(432.1)

*Goldschmidt, Johannes, **Das Klima von Sachsen.** [The climate of Saxony.] Berlin, Akademie-Verlag, **1950.** 35 p. 12 figs., 14 tables. (*Meteorologischer Dienst der Deutschen Demokratischen Republik, Abhandlungen* No. 3.) **MH-BH**—A descriptive and analytical study of the climate of Saxony, including discussion of general influences (topography, radiation, latitude and altitude); the seasons (winter, spring, summer and fall); regional variations in temperature, precipitation, cloud, sunshine, etc.; föhn effects (which are pronounced in Saxony); and microclimatic and other local variations. There is a chapter on the climate of large cities and, finally, four pages of monthly and annual climatic data for 33 places with records for 12 cities divided into two series, 1864–1920 and 1921–1938. Precipitation data are also presented on two large colored isoline charts of the region. *Subject Headings:* **Climatology, Saxony.**—*M.R.*

10–154 551.582:355(519)

Ludlum, David M., **The weather and climate of Korea.** *Weatherwise*, 3(4):80–82, Aug. **1950.** 3 figs. **MH-BH**—Popular discussion of climate of Korea: rainfall and temperature, typhoons and frontal storms and application to military operations; with few illustrative isoline charts for January and July. *Subject Headings:* **Climatology, Military operations, Korea.**—*M.R.*

10–155 551.582(499)

†*Rauh, Werner, **Klimatologie und Vegetationsverhältnisse der Athos-Halbinsel und der Ostägäischen Inseln Lemnos, Evstratios, Mytaline und Chios.** [Climatology and vegetative conditions on the Athos peninsula and the islands of Lemnos, Evstratios, Mytilene and Chios in the Aegean Sea.] *Heidelberger Akademie der Wissenschaften, Math.-naturwis. Klasse*, No. 12, **1949.** 30 figs., 12 tables, refs. **DLC**—After a dozen pages of introductory matter on the climate and geography of Greece and neighboring islands, a chapter on climatology (p. 13–32) contains detailed data on surface winds and less detailed material on temperature and rainfall. Tables and wind-roses showing the direction, force and frequency of winds at 08, 14 and 19 h, are presented for six stations. Special winds such as the Vardar, the Athens-Fallwind, the Struma-Fallwind and the Dardanelle Düsenwind are described and their nature and the area affected shown on original charts. Effects of climate on vegetation also considered. The study is based on original research done by the author in 1942, using in addition data for the period 1936–1942. *Subject Headings:* **Climatology, Special winds, Greece, Aegean Sea.**—*M.R.*

10–156 551.582.1(519)

Burgess, C. R., **The climate of Korea.** *Weather*, 5(8):277, Aug. **1950. MH-BH**—Brief descriptive account. *Subject Headings:* **Climatology, Korea.**

CLIMATIC VARIATIONS

10–157 551.583(474)

Groissmayr, Fritz Béla, **Die grosse Klimaschwankung seit 1935 im subpolaren Raum.** [The big climate oscillation since 1935 in the subpolar area.] *Polarforschung, Kiel*, 15(1–2):15–16, **1945.** 3 tables.—January temperatures from 1861–1945 are analyzed by 5 year periods for Kremsmünster, Frankfurt/M, Königsberg, Uppsala, Haparanda and Omcha. Conclusion

is that data verifies the author's former statement that in the Baltic region a cold winter is usually followed by a cold spring and vice-versa. *Subject Headings:* **Climatic variations, Extreme winters, Baltic Coast.**—*M.R.*

10–158 551.583:551.524.33 551.509.33(98)

Groissmayr, Fritz Béla, **Weltwetter und Klimaschwankung im Nordpolargebiet.** [World weather and climate oscillation in north Polar area.] *Polarforschung, Kiel,* 15(1–2):5–9, **1945.** 6 tables, 3 refs.—The long period temperature records for Greenland, Iceland, Alaska, Canada, Europe and northwest Siberia are analyzed and correlated to determine the reality and nature of climatic changes or variations in the Polar region during the last few decades (1876–1939). The analysis indicates that (1) there has been an increase in winter temperature on the west coast of Greenland; (2) there is evidence of a 24-year period in temperature fluctuation; (3) abnormal warmth in one part of the Arctic is accompanied by abnormal cold in the other; (4) a severe winter may be expected in western Europe if there are abnormally low temperatures during Sept. and Oct. in northwest Siberia. Further study necessary to completely verify author's conclusions. *Subject Headings:* **Climatic variations, Long range forecasting, Temperature periodicities, Arctic Regions.**—*M.R.*

10–159 551.583.14(4)

†*Groissmayr, Fritz Béla, **Die grosse säkulare Klimawende um 1940 und das Katastrophenjahr 1947 in Zentraleuropa.** [The great secular fluctuation of climate in 1940 and the catastrophic year of 1947 in Central Europe.] *Deutscher Wetterdienst in der US-Zone, Berichte,* No. 10, **1949.** 39 p. 2 figs., 99 tables, 45 refs. **DWB**—This monograph consists of a number of detailed statistical studies on climatic variations in various parts of the earth, using analytical data based on Clayton's **World Weather Records** for the period from the middle of the 19th century up to 1940, and data from various sources for 1941–1947. Variations in mean temperature, pressure, ice conditions, circulation (as determined from pressure differences between key stations) etc., are computed for five year periods during the entire period of record. The chapters include: 1) climatic variations in the Arctic, 2) the great secular change of temperature over northern Europe about and after 1940, 3) the catastrophic year 1947 in Central Europe, 4) the heat record in summer of 1946 in Hungary, 5) the position of Switzerland in the climatic reversal of 1940, 6) the so called "Normal period" 1901–1930, 7) the world-wide drought period 1931–1935, 8) the march of continentality, 9) some conclusions on the climatic trends in North America and Asia. The conclusion is that, although there was a definite trend for several decades up to 1940 and a seeming reversal of trend at about that time, we can in no wise predict a uniformly continuing trend in any direction for the future. *Subject Headings:* **Climatic variations, Central Europe.**—*M.R.*

10–160 551.583.2

Flohn, Hermann, **Klimaschwankungen im Mittelalter und ihre historisch-geographische Bedeutung.** [Climatic oscillations in the Middle Ages and their historical-geographical significance.] *Berichte zur Deutschen Landeskunde,* 7(2):347–357, **1950. MH-BH**—From a rapid summary of historical evidence for changes of climate in Europe since about A. D. 1000, author concludes that around A. D. 1200 climate was appreciably warmer than now. There was a temporary worsening about 1430–1450 and a much longer cold period beginning about 1550. These are also shown by wine harvests. Periods of cold winters are attributed to cellular (monsoon) circulation, those of mild winters to zonal circulation. *Subject Headings:* **Climatic changes, Historical climates, Atmospheric circulation.**—*C.E.P.B.*

10–161 551.583.2:58:551.311.123

Lawrence, Donald B., **Estimating dates of recent glacier advances and recession rates by studying tree growth layers.** *American Geophysical Union, Transactions,* 31, Pt. 1, (2):243–248, April **1950.** 2 figs., 14 refs. **DWB, MH-BH**—Studies of tree rings from vicinity of glaciers provide evidence of year when glacier reached its farthest advance. Where trees have been tallest but not uprooted, the growth suddenly becomes eccentric, marking plainly date of felling. Evidence from Alaska, British Columbia and the Pacific Northwest examined. *Subject Headings:* **Climatic changes, Dendrochronology, Glaciation, Pacific Northwest.**—*M.R.*

MICROCLIMATOLOGY

10–162 551.584:551.588:69(753

Landsberg, H. E., **Comfortable living depends on microclimate.** *Weatherwise*, 3(1):7–10 Feb. 1950. 3 figs. **MH-BH**—On a hot day (Aug. 11, 1949) it was 8.5°F. cooler in the shad near Fairfax than in the business section of Washington, D. C., and at 10 P.M. that day i was 6° to 11° cooler in the suburbs than in the city. Effect due to concrete, brick and asphal in city, and to vegetation and drainage in suburbs. Other ways of controlling heat or fros by landscaping or design of buildings are mentioned. *Subject Headings:* **Microclimatology Topographic effects, Building design, Washington, D. C.**—*M.R.*

10–163 551.584.2(429

Smith, L. P., **Variations of mean air temperature and hours of sunshine on the weathe slope of a hill.** *Meteorological Magazine, London*, 79(938):231–233, Aug. 1950. 2 figs., table **MH-BH**—Tabulates and illustrates monthly mean temperature and sunshine at three station near Aberystwyth, Wales (12, 452, 950 ft. above M.S.L.). Temperature lapse near 1°F./30 ft., least in spring. Decrease of sunshine with height $0.22h^{7/4}$ (h in hundreds of feet). *Subje Headings:* **Mesoclimatology, Temperature variations, Wales.**

10–164 551.584.42:551.525.2(44

†*Arléry, R. and Dumont, A. P., **Comparaison des températures minimum au sol et sou abri.** [Comparison of minimum temperatures at the ground and in a shelter.] *La Météo ologie*, 4th Ser., No. 15:157–165, July–Sept. 1949. 6 figs., 5 tables, 23 refs. Summaries i French and English p. 157. **MH-BH**—A number of important papers (mostly French) on th theory and practice of measuring ground temperatures, are reviewed. Data are presente for Paris, Dijon, Lyon, Montélimar and Antibes (3–20 years) showing graphically and i tables the monthly and annual frequency of minimum temperature difference (shelter-gras according to 1°C. class intervals. *Subject Headings:* **Microclimatology, Grass temperature France.**—*M.R.*

10–165 551.585:551.588.

†Creutzburg, N., **Klima, Klimatypen und Klimakarten.** [Climate, climatic types an climatic charts.] *Petermanns Geographische Mitteilungen*, 94(2):57–69, 1950. colored cha (in fold.), 72 refs. **DLC**—A lengthy discussion of climatic classification based on: 1) th relation of climate to vegetation, 2) thermal or 3) aridity considerations. The author modifi the classical climatic charts of the earth by taking into consideration the effect of altitude elevation, according to three categories and presents his revision on a large color chart of t earth. The bibliography should be of some use. *Subject Headings:* **Climatic classificatio Topographic effects.**—*M.R.*

10–166 551.585.1 551.588.2(491.3, 48

Raunio, Niilo, **The effect of local factors on the meteorological observations at Tórshav** *Geophysica, Helsinki*, 3:173–179, 1948. fig., ref. **MH-BH**—Thorshavn, situated on one of t Faeroe Islands, is considered as a representative oceanic place and as ideal for making ocean observations. The author analyzes the effect of mountains sheltering the town on its weste side, upon the regime of winds, cloudiness and rain and the influence of ground upon tempe ature. *Subject Headings:* **Oceanic climates, Topographic effects, Faeroe Islands.**—*I.L.D.*

BIOCLIMATOLOGY

10–167 551.586:

†*Armand, D. L., **Opyt matematicheskogo analiza sviazi mezhdu tipami rastitel'nost klimatom.** [Attempt at a mathematical analysis of the connection between vegetati and climate.] *Vsesoiuznoe Geograficheskoe Obshchestvo, SSSR, Izvestiia*, 82(1):19–49, Jan Feb. 1950. 6 figs., 6 tables, 26 refs., 4 equations. **DLC**—An elaborate statistical analysis the correlation between climatic factors (incoming radiation, temperature and humidity) a ecology of natural vegetation. A coefficient of 0.90 was obtained for the forest zones, of 0. for the tundra and 0.08 for the steppe when correlated with solar and effective radiation.

wide variation in correlation coefficients was also obtained for hydrothermal coefficients (heat and moisture) and vegetation. For the desert steppe zone a low value of (0.07–0.11) was obtained, slightly higher for the coniferous forest zone and a high correlation for the broad leaf forests and grassy steppe zones. *Subject Headings:* **Agricultural meteorology, Climatic zones.** —*M.R.*

10–168 551.586:63

Doroganevskaia, E. A., **Klimat i khimizm rasteniĭ.** [Climate and the chemistry of plants.] *Problemy Fizicheskoĭ Geografii*, 12:129–139, 1946. 25 refs. **DLC**—A lengthy review of numerous works in the U.S.S.R. and the U.S.A. on the effect of meteorological and climatic conditions on the chemical processes of plant growth. The author cites the work of Koloskov, Davitaia, Ivanov, Selianinov and others in the Soviet Union; and states that the work done in the U.S.A. has been deficient since it was not coordinated at the top level. Importance for future development in evolutionary biochemistry and in transfer of industry to the East, in the U.S.S.R., stressed. *Subject Headings:* **Agricultural meteorology, Plant chemistry.**—*M.R.*

10–169 551.586:63

*Hustich, Ilmari, **Den klimatiska hasardfaktorn för jordbruk och skogsskötsel i Finland.** [On the climatic hazard factor in agriculture and forestry in Finland.] *Ymer, Stockholm*, 68(2):121–127, **1948.** 3 figs., 4 tables, 6 refs. **DLC**—A statistical study of the effect of year-to-year variations in climate on yield of crops (rye) in different parts of Finland. The author computes a climatic hazard coefficient, based on the standard deviation σ of the annual variation of temperature from the mean and correlates that with rye harvest data. The hazard in various districts of Finland is then considered. The same principle is applied to radial growth of timber. This is important to the far north, where growth is very sensitive to annual variations in temperature. The recent climatic "trend" is noticeable in the advance of forests toward the north in Finland. *Subject Headings:* **Climatic variations, Agricultural climatology, Forestry, Finland.**—*M.R.*

10–170 551.586:63:519.2

*†Massibot, J. A., **La technique des essais culturaux et des études d'écologie agricole.** [Technique of agricultural experiments and of studies of agricultural ecology.] Tourcoing, Éd. Georges Frère, **1946.** 737 p. 153 figs., 133 tables. Extensive classified biblio.—Although mainly agricultural, this work includes much of interest to meteorologists. Pt. I, p. 11–134, is a textbook of statistical methods applied to agricultural research. Pt. II, p. 137–337, describes the experimental methods of investigating crop yields and the statistical analysis of the results. Pt. III, p. 341–456, describes a number of cultural experiments. Pt. IV, p. 459–559, deals with biochemical and bioclimatic control and includes a long section on agricultural phytoclimatology (variability of physical factors, experimental methods of measurement of different climatic factors, establishment of phytoclimatic stations, comparison of phenological, agricultural and climatic data with calculation of correlation coefficients). Appendices include a large number of useful statistical and other tables. *Subject Headings:* **Agricultural meteorology, Statistical analysis.**—*C.E.P.B.*

10–171 551.586:63(497.1)

Nuttonson, Michael Y., **Agricultural climatology of Yugoslavia and its agro-climatic analogues in North America.** Washington, D. C., American Institute of Crop Ecology, **1947.** 1 p. fig., table, refs. (*International Agro-climatological Ser.*, No. 4.) **DA**—Table gives mean temperature for each month, extremes, killing frost limits, average monthly precipitation, latitude, altitude, length of record and climatic analogy in the United States, for 41 stations in nine provinces of Yugoslavia. Analogues also shown on topographic chart of Yugoslavia. Text very brief. *Subject Headings:* **Bioclimatology, Agricultural climatology, Yugoslavia.** —*M.R.*

10–172 551.586:551.506.8:63

*Minář, M., **Vegetační období v Protektorátu Čechy a Morava.** [The vegetation period in the protectorates of Bohemia and Moravia.] *Czechoslovakia, Výzkumný Ústav Zemědělský*

Zprávy, No. 80, **1944.** 72 p. fold. chart, 4 diagrams (3 fold.), 6 tables, 4 refs. **DLC**—An investigation of the effect of elevation (above sea level) on the duration of the vegetative period in Czechoslovakia. The vegetation period is defined as the number of consecutive days when the daily mean temperature is above 10°C. Monthly mean temperature data and length of vegetation period for 335 stations (in and near Bohemia and Moravia), for periods of record varying from 5 to 50 years down to 1944 are presented in carefully annotated tables. A large scatter diagram shows the relation between elevation and growing period for four different zones. The entire text and the captions of tables and charts are presented in both German and Czech. *Subject Headings:* **Phenology, Agricultural meteorology, Temperature data, Czechoslovakia.**—*M.R.*

10–173 551.586:635

Sinha, K. C. and Minett, F. C., **Application of water to the body surface of water buffaloes and its effect on milk yield.** *Journal of Animal Science*, 6(3):258–264, Aug. **1947.** fig., 4 tables, ref. **DA**—This article indicates that in order to obtain a normal milk yield, water buffaloes must be cooled by daily wetting of the body surface, otherwise the milk yield decreases and becomes more irregular. *Subject Headings:* **Agricultural meteorology, Dairying, Physiological climatology.**—*I.L.D.*

10–174 551.586:636

Minett, F. C., **Effects of artificial showers, natural rain and wallowing on the body temperatures of animals.** *Journal of Animal Science*, 6(1):35–49, Feb. **1947.** 5 figs., 4 tables, 3 refs. **DA**—The author discusses the effect of artificial and natural rain upon the body temperature of water buffaloes, zebra and hill cattle, and of sheep; and the effects of wallowing and hosing upon water buffaloes. Artificial showers lower the rectal temperature of buffaloes by 2.8°F. in the morning and 2.6°F. in the afternoon and that of zebra cattle by only 0.5°F in the afternoon. Natural rain reduced the mean body temperature of buffaloes by 0.7° to 2.7°F., of hill cattle by 1.6° to 3.8°F. and of sheep by 1.4° to 2.7°F. The wallowing behavior of water buffaloes was investigated and the effectiveness of wallowing and hosing in the cooling of water buffaloes are compared. *Subject Headings:* **Agricultural meteorology, Animal husbandry.**—*I.L.D.*

10–175 551.586:636

Seath, D. M. and Miller, G. D., **Effect of warm weather on grazing performance of milking cows.** *Journal of Dairy Science*, 29(4):199–206, April **1946.** 5 tables, 4 refs. **DA**—This article is concerned with the changes in body temperatures and pulse and respiration rates of cows on pasture during relatively warm days and with the manner in which warm weather affects the grazing habits of milking cows. The cows showed a progressive rise in body temperature and in respiration rate throughout the day but the pulse rate remained constant. During the relatively warm days, daytime grazing periods were very short (1.8 hours); nighttime grazing periods were three times as long (5.4 hours). Grazing periods were twice as numerous at night as in the daytime. *Subject Headings:* **Agricultural meteorology, Physiological climatology, Dairying.**—*I.L.D.*

10–176 551.586:636

Seath, D. M. and Miller, G. D., **The relative importance of high temperature and high humidity as factors influencing respiration rate, body temperature, and pulse rate of dairy cows.** *Journal of Dairy Science*, 29(7):465–472, July **1946.** 3 figs., table, 13 refs. **DA**—The animals studied were Holstein and Jersey milking cows. Changes in air temperature are the major cause of increases in body temperature and respiration rate of milking cows. Multiple regression equations indicate that one degree rise in air temperature causes 13 to 15 times as much increase in body temperature as one percent increase in relative humidity. One degree change in air temperature influenced respiration rate 41 to 43 times as much as one percent change in relative humidity. Pulse rates were less affected by air temperature or relative humidity. *Subject Headings:* **Agricultural meteorology, Dairying, Physiological climatology.**—*I.L.D.*

EFFECT OF ENVIRONMENT

10–177 551.588.1:551.465

Model, Fritz, **Warmwasserheizung Europas.** [Heating of Europe by warm water.] *Deutscher Wetterdienst in der US-Zone, Berichte*, No. 12, p. 51–60, **1950.** 7 figs., tables, 26 refs. **MH-BH**—The European North Sea and Arctic receive from warm Atlantic currents 16×10^{12} cal./sec. This heat reaches the air through the ice and ameliorates climate of Europe indirectly. But the Gulf Stream in 20–60°N gives up another 192×10^{12} cal./sec. to the air (estimated from anomaly of salt content). This is more than the equatorial Atlantic receives by balance of radiation. Author considers that this extra supply of heat comes directly or indirectly from Indian or Pacific Oceans. *Subject Headings:* **Climatic amelioration, Continentality, Europe.**—*C.E.P.B.*

10–178 551.588.1:551.589.1

Paulsen, Wolfgang, **Witterungsklimatische Betrachtungen über Kontinentalitätskoeffizienten.** [Considerations of weather and climate in coefficients of continentality.] *Meteorologische Rundschau*, 3(5–6):126–131, May–June **1950.** 3 figs., 6 tables, 12 refs. **DWB, MH-BH**—The continentality coefficient (Kk) measures the relative importance of Atlantic and Siberian influence in any weather situation. Four criteria described: air mass (heat content); weather type (wind direction); broad weather situation (steering); N–S pressure gradient. The Kk by these criteria is compared for 1930–1939 for May (continental) and June (maritime). Figures show the 10-year mean Kk for each day given by each criterion, the variation by decades and year by year. Kk reaches a minimum in mid-May and a maximum at end of May. *Subject Headings:* **Continentality, Marine influences.**—*C.E.P.B.*

10–179 551.588.2:551.591:551.576.4

Nurminen, Aili, **Stauwirkung der Salpausselkä-Hügelkette.** [Orographic upslope effect of the Salpausselkä range.] *Geophysica, Helsinki*, 3:180–192, **1948.** 2 figs., 12 tables, 7 refs. Summary in English p. 191–192. **MH-BH**—This article is a study of the influence of the Salpausselkä range upon visibility and ceiling on the southeast slope of this range. The author discusses the relationship between upslope and wind direction, the effect of upslope weather upon visibility, and the relationship between upslope and ceiling. Data are presented on the vertical distribution of temperature in the southeast wind during which the upslope effects are most marked. *Subject Headings:* **Topographic effects, Visibility, Cloud height, Aviation climatology, Finland.**—*I.L.D.*

10–180 551.588.2:633

Wagner, Heinrich, **Vegetationsunterschiede am Süd- und Nordhang (Ennstal).** [Differences of vegetation on south and north slopes (Enns valley).] *Wetter und Leben*, 2(11–12):261–266, June **1950.** 3 tables. **DWB**—River Enns runs W–E through uniform poor soil with mountain meadows. These show five different plant associations according to aspect and steepness of slope; species in each listed and numbers of plants given under dry heat, meadow, humid. Possibilities of utilizing slopes discussed. *Subject Headings:* **Agricultural climatology, Topographic effects, Germany.**—*C.E.P.B.*

10–181 551.588.5:551.524

†Hare, F. Kenneth and Montgomery, Margaret R., **Ice, open water, and winter climate in the eastern Arctic of North America:** Part I. **Distribution of winter temperature over the eastern Arctic and sub-Arctic.** *Arctic, Montreal*, 2(2):79–89, Sept. **1949.** 9 figs., 12 refs. **DLC.** Part II. **The pattern of winter ice.** *Ibid.*, 2(3):149–164, Dec. **1949.** fig., 14 photos, map, 28 refs. **DLC**—The idea which has long been maintained that Hudson Bay does not freeze over solid in winter is disputed by the writers, who present indirect evidence gained from a study of the anomalous effects of open water on temperature at coastal stations in the Arctic. The conclusion is that absence of such anomalous effects in records of Canadian stations (1930–1948) points to an absence of any large open water areas in that region. Detailed monthly average isotherm charts are presented for the area between Greenland and Hudson Bay. In Pt. II, the results of air reconnaissance by the Royal Canadian Air Force in this region (1927–

1928 and 1948–1949) are discussed, and many photographs presented, to show the actual ice conditions in Hudson Bay; thus supporting the above argument that there is little open water in Hudson Bay in winter months. *Subject Headings:* **Topographic effects, Polar ice, Canada.** —*M.R.*

MISCELLANEOUS APPLICATIONS

VISIBILITY

10–182 551.591

*Meurers, Joseph, **Sichtuntersuchungen am Aeronautischen Observatorium Lindenberg.** [Visibility investigations at the Lindenberg Aeronautical Observatory.] *Deutscher Wetterdienst in der US-Zone, Berichte*, No. 13, **1950.** 19 p. 10 figs., 2 tables, 6 equations. **MH-BH**—This is a comprehensive but qualitative review of studies on visibility carried out at Lindenberg in 1944. The experimental procedures and method of analysis of data are presented. The investigation was concerned with visibility and atmospheric turbidity during daylight, at night and during morning and evening twilight and with the interrelationship between visibility and atmospheric turbidity. The influence of meteorologic factors and of latitude are also discussed. The author presents curves by means of which daylight and night visibility during twilight can be predicted if atmospheric turbidity remains constant. *Subject Heading:* **Visibility.**—*I.L.D.*

10–183 551.591.36:551.586:621.396.11

†*Zenone, E., **Über Sicht- und Bewölkungsverhältnisse auf dem Flugplatz Locarno-Magadino.** [Visibility and cloud conditions at the airport of Locarno-Magadino.] *Switzerland, Meteorologische Zentralanstalt, Annalen*, p. 1–13, **1945.** 6 figs., 15 tables, 20 refs. (Reprint available.) **DWB**—A detailed statistical study of local visibility and cloud frequencies during the different months and times of day for 1940–1945. Comparison of visibility data with precipitation, fog, wind, humidity and cloudiness data reveals the main causes of poor visibility and explains the diurnal and seasonal variations. A comparison is made between conditions at other airports (Birsfelden, Cointrin and Dübendorf) and those at Locarno Airport, which is located in the Magadino Valley in the southern Alps. *Subject Headings:* **Visibility, Aviation climatology, Locarno, Switzerland.**—*M.R.*

AURORA

10–184 551.594.5

Chistiakov, V. F., **Poliarnoe siianie 25 ianvaria 1949 g. v Kaliningrade.** [Polar aurora on Jan. 25, 1949 at Kaliningrad.] *Priroda, Moscow*, 39(2):30, Feb. **1950.** Bakharev, A. M., **Grandioznoe poliarnoe siianie.** [Spectacular polar aurora.] *Ibid.*, p. 30. **DLC**—Detailed observations (every five minutes) of an unusual polar aurora at the town of Kaliningrad (54°43′N). Followed by a note by A. M. Bakharev on observations of a "Grandioznoe poliarnoe siianie" from Jan. 24–26, 1949 at Murmansk, Poliarnom and Tartu, where a brilliant corona and rays covering the whole sky were observed. *Subject Headings:* **Auroras, U.S.S.R.** —*M.R.*

10–185 551.594.5

Schmid, Rudolf, **Das Nordlicht und seine physikalische Erklärung.** [The aurora borealis and its physical explanation.] *Natur und Technik, Vienna*, 3(2):40–42, **1949.** 2 figs. **DLC**—Semipopular review of present and past investigations and status of knowledge of the aurora and related phenomena. *Subject Heading:* **Auroras.**

10–186 551.521.4 551.594.5

Swings, P., **The spectra of the night sky and the aurora.** (In **Atmospheres of the earth and planets,** Gerard P. Kuiper, (ed.) Chicago, University of Chicago Press, [1949]. p. 159–212. 6 figs., table, refs., 14 equations.) **DLC**—This article is a comprehensive survey of the theoretical and observational data on the emissions of the night sky of the twilight and of auroras that have appeared approximately during the past decade. The author considers the

following topics: atomic lines, the various systems of molecular bands, determinations of temperature on the basis of rotational intensity distribution in the molecular bands, the height of emission and variations of intensity of spectral lines. The mechanism of night sky and auroral emission is discussed in the light of information provided by ionospheric studies on the composition and ionization of the upper atmosphere and on the radiation and corpuscles that reach the different layers. An attempt is made to determine the relationship between variations in the ionosphere and auroral and night sky emissions; and to interpret the ionosphere by means of information obtained from spectra of the night sky, twilight and auroras. *Subject Headings:* **Light of the night sky, Auroras.**—*I.L.D.*

PART II. SELECTIVE ANNOTATED BIBLIOGRAPHY ON PROPAGATION OF ACOUSTIC AND EXPLOSION WAVES IN THE ATMOSPHERE

By: *Harris P. Kramer and Malcolm Rigby*

EXPLANATORY NOTE

In this bibliography emphasis is placed on articles concerning the anomalous propagation of sound as used for determining conditions in the stratosphere. Limitations on time and space have made it impossible to include references to all articles pertaining to this subject. However, anyone wishing to make an exhaustive survey will find extensive lists of references in the works designated by a dagger (which indicates a good bibliographic source). We wish to call special attention to *item* J–43 which contains 193 references.

Some supplementary material is included on subjects closely related to acoustical phenomens such as atmospheric pressure oscillations, and air waves from explosions, including meteoric, volcanic, atomic and other violent explosions.

Items are arranged chronologically by year and alphabetically within each year. The following outline of contents indicates the scope of the subject matter in this bibliography.

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- Sound propagation, J–1, –8, –12, –18, –31, –37, –40, –44, –47, –63, –67, –69, –73, –74, –77, –78, –79, –80, –83, –84, –85, –102, –103, –112.
- Anomalous sound propagation, J–2, to –5, –7, –9 to –11, –13, –14, –16 to –22, –25, –26, –28, –30, –31, –33, –34, –36, –38, –41, –46 to –48, –51, –55 to –57, –59, –60, –62, –64 to –66, –68, –77, –81, –82, –87, –88, –93, –94, –97, –106 to –108.
- Audibility zones, J–5 to –7, –9, –13, –16 to –18, –20, –23, –24, –27, –29, –31 to –33, –37, –44, –51, –54, –67, –79, –107
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- Ultrasonics, J–70, –96
- Sound rays, J–95
- Acoustical sound detector, J–103

Acoustical Sounding of Atmosphere, J–39, –43, –55, –58, –59, –62, –93, –95, –100, –108.
- Structure of stratosphere, J–3, –30, –34, –36, –38, –40, –41, –45, –49, –52, –54, –57, –64, –66, –67, –87, –88, –91, –98
- Upper air winds, J–10, –59, –88, –108
- Upper air temperatures, J–15, –16, –25, –26, –33, –39, –46, –49, –75, –79, –81, –88, –100, –106 to –108
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- Turbulence, J–69, –84, –85, –86

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- Shock waves, J–82, –92
- Meteor explosions, J–15
  - Great Siberian (Tungus) Meteor (1908), J–19, –42, –61, –72, –101, –104, –110
  - Sikhote-Alin Meteor (1947), J–101
  - Kurhessen Meteor (1916), J–19
  - British Meteor (Oct. 2, 1926), J–29, –33
  - Meteor (July 28, 1915), J–6
- Volcanic explosions
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  - Krakatoa (1883), J–1, –76, –110
- Other explosions
  - Guns at Queen Victoria's funeral (1901), J–7
  - Wiener-Neustadt (1912), J–5, –18
  - Moscow (1920), J–32
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Oldebroek (1932), J–54, –56, –58, –67
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Wave mechanics and Wave forms, J–109

BIBLIOGRAPHY ON ACOUSTICAL PROPAGATION

1883–1899

J–1 551.596.1:551.541

†*Royal Society of London, Krakatoa Committee, **On the air waves and sounds caused by the eruption of Krakatoa in August, 1883.** Part II. (In **The eruption of Krakatoa and subsequent phenomena.** London, Trübner & Co., **1888.** p. 57–88. 16 plates, 9 tables, refs.) **DLC**—Stations listed from which barometrical or other observations were received, with description of recording instruments. Times of passage of air waves over each station recorded. Velocities of air waves calculated. Section on "Sounds" states that the detonations were heard over nearly one-thirteenth of the earth's surface. List of places at which sounds heard given, including Rodriguez, nearly 3000 miles from Krakatoa. Detailed data are included. *Subject Headings:* **Acoustical phenomena, Explosion waves, Krakatoa eruption (1883).**

J–2 551.596.1

Ventosa, V., **Les anomalies de la propagation du son.** [The anomalies of the propagation of sound.] *Ciel et Terre*, 19, **1898.** 12 p. refs. (Reprint.) **DWB**—Interesting account of early observation of anomalous propagation and zone of silence. Speculations include consideration of wind and temperature effects. *Subject Headings:* **Anomalous sound propagation, Acoustical phenomena.**

1900–1919

J–3 551.596.1

von dem Borne, G., **Über die Schallverbreitung bei Explosionskatastrophen.** [The propagation of sound after great explosions.] *Physikalische Zeitschrift*, 11:483–488, **1910.** 2 figs., table, refs., 14 equations. **DWB**—Observations and theories on anomalous sound propagation are presented. Suggested that increased sound velocity at high altitudes is based on assumed high concentration of lighter gases, mainly hydrogen and helium. This theory is no longer considered valid. *Subject Headings:* **Anomalous sound propagation, Structure of stratosphere.**

J–4 551.596.1

†*§Fujiwhara, S., **On the abnormal propagation of sound wave in the atmosphere.** *Japan, Central Meteorological Observatory, Bulletin*, 2, No. 1, **1912.** 42 plates (including synoptic charts), 16 extensive tables, refs., equations. **DWB**—Detailed reports of various Asama eruptions, as well as of some other lesser explosions. Tables and figures illustrate spread of sound and air waves. Theories of sound propagation treated in detail. Interesting and valuable contribution to the study of sound propagation. *Subject Headings:* **Anomalous sound propagation, Asama eruptions, Japan.**

J–5 551.596.1

*Dörr, Josef Norbert, **Über die Fernwirkung der Explosion auf dem Steinfelde bei Wiener-Neustadt am 7. Juni 1912.** [The long range effects of the explosion at Wiener-Neustadt on June 7, 1912.] *Vienna, Akademie der Wissenschaften, Sitzungsberichte, Math.-Naturwis. Klasse*, 122(IIa):1683–1732, Oct. **1913.** 12 tables, fig., refs. **DWB**—Inner and outer audibility zones and zones of silence distinguished. Good thorough early observations of such acoustical phenomena. *Subject Headings:* **Anomalous sound propagation, Audibility zones, Wiener-Neustadt explosion (1912).**

J–6 551.596.1

de Quervain, A., **Das Meteorbeben vom 28 Juli 1915.** [The meteor explosion waves on July 28, 1915.] *Jahresbericht des Schweizerischen Erdbebendienstes*, Zurich, **1916.** 13 p. (Unchecked)—Observations collected on this occasion indicate the existence of an outer zone of audibility. *Subject Headings:* **Meteor explosions, Acoustical phenomena, Audibility zones.**

J–7 551.596.1

Davidson, Charles, **The sound of a great explosion.** *Quarterly Review*, 452:51–60, **1917.** 2 figs., ref. **DLC**—First recognition of abnormal behavior of sound waves in 1901, when noise from guns at Queen Victoria's funeral in London was heard at long distances but not near London. First explanation of zone of silence attributed to an upward refraction of sound waves through the troposphere, followed by downward bending of the waves by increasing wind velocity at higher altitudes. Figure shows sound areas. *Subject Headings:* **Anomalous sound propagation, Audibility zones.**

J–8 551.596.1

Schrödinger, E., **Zur Akustik der Atmosphäre.** [On acoustics of the atmosphere.] *Physikalische Zeitschrift*, 18:445–453, **1917.** fig., 17 refs., 36 equations. *Ibid.*, p. 567, 1917. 9 refs. **DLC**—Discussion of physics of anomalous propagation of sound after great explosions and the kind of sound waves which travel at great altitudes. Numerous equations are given allowing for influences of air density, water vapor pressure, unhomogeneity of air mass, heat conductivity, and length of sound wave. Absorption of sound waves in air depends on the ratio of sound wave length to mean free path length of the gas molecules. Sound energy absorption is illustrated per km. of path in an isothermal atmosphere. *Subject Headings:* **Acoustical phenomena, Sound propagation, Sound absorption.**

J–9 551.590.25

†Wegener, Alfred, **Das detonierende Meteor vom 3 April 1916, 3½ Uhr nachmittags in Kurhessen.** [The detonating meteor of April 3, 1916, 3½ hours after noon in Kurhessen.] *Gesellschaft zur Beförderung der gesamten Naturwissenschaften zu Marburg, Schriften*, 14(1):1–83, **1917.** 7 figs., tables, 36 refs. **DGS**—Detailed observations made of the incident at various points: physical phenomena, the trail, etc., and the sound. Zones of silence observed after this occurrence between Narburg and Cassel. Two earlier instances cited, supporting the hypothesis of the occurrence of an outer zone of audibility. *Subject Headings:* **Meteor explosions, Anomalous sound propagation, Audibility zones.**

1920–1929

J–10 551.596.1:551.557

Aichi, Keiichi, **On the distribution of the wind velocity when the abnormal propagation of sound occurs.** *Also:* Appendix on the velocity of the sound propagation in the windy atmosphere. *Physico-Mathematical Society of Japan, Proceedings*, 3rd Ser., 2(4):63–69, April **1920.** refs., 8 equations. (Reprint.) **DWB**—Theoretical discussion. *Subject Headings:* **Anomalous sound propagation, Upper air winds.**

J–11 551.596.1

de Quervain, A., **Ein erster Fall diametraler Ausbildung des anormalen Schallgebietes und seine Bedeutung. (Explosion von Vergiate vom 26 Nov. 1920.)** [A first case of the diametrical formation of the abnormal sound zone. (Explosion at Vergiate Nov. 26, 1920.)] *Jahresbericht des Schweizerischen Erdbebendienstes, Zurich*, p. 11–15, **1920.** (Unchecked)—*Subject Headings:* **Anomalous sound propagation, Vergiate explosion (1920).**

J–12 551.596.1

Milne, E. A., **Sound waves in the atmosphere.** *London, Edinburgh, and Dublin Philosophical Magazine*, 42:96–114, **1921.** 7 figs., refs., 49 equations. **DLC**—This paper deals with the kinematics of the propagation of sound waves through a medium (such as the atmosphere) in which the velocity of the medium and the velocity of sound in the medium vary from point to point. Subject taken up in connection with location of aircraft by sound. Sections take up: equations of propagation; the general refraction formula for stratified media; application to a point source in the atmosphere; total reflection and the range of audibility; cases of limited audibility etc. *Subject Headings:* **Acoustical phenomena, Sound propagation.**

J–13 551.596.1

*§de Quervain, A., **Explosion von Oppau am 21 September 1921.** [Explosion at Oppau on Sept. 21, 1921.] *Schweizerische Meteorologische Zentralanstalt, Annalen*, **1921.** 3 figs., table, refs. (Reprint.) **DWB**—Discussion, records, synoptic charts and zones of audibility given for Oppau explosion, Sept. 21, 1921. *Subject Headings:* **Anomalous sound propagation, Audibility zones, Oppau explosion (1921).**

J–14 551.596.1

†Zierl, Hermann, **Die Hörbarkeit der Explosion von Oppau in Bayern rechts des Rheines.** [Audibility of the explosion at Oppau in Bavaria on the right bank of the Rhine.] *Deutsche*

Meteorologisches Jahrbuch für Bayern 1921. [1922.] fig., table, 120 refs. (Reprint.) **DWB**—Abnormal sound propagation noted after this explosion at Oppau Sept. 21, 1921. Good references to early works on subject of abnormal sound propagation. *Subject Headings:* **Anomalous sound propagation, Oppau explosion (1921).**

J–15 551.524.7:523.52

Lindemann, F. A. and Dobson, G. M. B., **A theory of meteors, and the density and temperature of the outer atmosphere to which it leads.** *Royal Society of London, Proceedings, A*, 102:411–437, **1923.** 6 figs., 4 equations. **DLC**—Found that temperatures do not decrease linearly with distance from earth. Sixty km. temperatures are essentially the same as earth level temperature and some 60° K hotter than region about 15 km. A tentative explanation is given to account for high temperatures based on the radiative properties of ozone. Formulas are derived, and from observed meteoric data the density or temperature of the air at great heights is calculated in four independent ways, which give results consistent with one another. *Subject Headings:* **Upper air temperatures, Meteors, Temperature of stratosphere.**

J–16 551.524.7:551.596.1

Whipple, F. J. W., **The high temperature of the upper atmosphere as an explanation of zones of audibility.** *Nature, London*, 111:187, **1923.** 3 refs. **DLC**—Author proposes that increased temperature in the stratosphere, as discovered by Lindemann and Dobson, (*see item* J–15), might well explain zones of silence and of abnormal audibility. *Subject Headings:* **Upper air temperatures, Anomalous sound propagation, Audibility zones.**

J–17 551.596.1

Maurain, Ch., **Sur la propagation des ondes aerienne lors des expériences de La Courtine.** [Propagation of air waves from the experiments at La Courtine.] *Académie des Sciences, Comptes Rendus, Paris*, 179:1334–1337, **1924.** 2 figs. **DLC**—Zones of audibility for sound waves from this explosion briefly described and explained. Figures illustrate zones of audibility. *Subject Headings.* **Anomalous sound propagation, Audibility zones, La Courtine explosion (1924).**

J–18 551.596.1

Angenheister, G., **Laufzeit des Schalls für grosse Entfernungen.** [The propagation time of sound for long distances. Pt. I.] *Zeitschrift für Geophysik*, 1:314–327, **1925.** 2 figs., 3 tables, 4 refs., equations. **DWB**—Speeds of propagation of normal and abnormal sound waves are tabulated and curves plotted. Several explosions in Germany cited for examples. **Pt. II.** *Ibid.*, 2:88–101, 1926. 3 figs., 3 refs., equation. **DLC**—Further comments and registrations of sound waves on the subject. The explosion at Wiener-Neustadt shows the form of the normal and abnormal zone of audibility developed from the presented theory. *Subject Headings:* **Anomalous sound propagation, Audibility zones, Wiener-Neustadt explosion (1912).**

J–19 551.590.25

Voznesenskii, Arkadii V., **Padenie meteorita 30 iiunia 1908 g. v verkhoviakh r. Khatangi.** [Falling of a meteorite on June 30, 1908, in the upper part of Khatanga Basin.] *Mirovedenie*, 14(1):25–38, Aug. **1925.** fig., 3 tables, 8 refs. **DLC**—Falling of this meteorite recorded by Magnetic-Meteorological Observatory, Irkutsk, as a light earthquake. From these data, the place of fall estimated to be in upper part of Khatanga River region 893 km. from Irkutsk. Earth tremblings noted at other points in radius 800 km. Powerful air waves observed in a radius of 900 km. Sounds of the explosion heard at a distance of 1350 km. From evaluating various records size and speed of fall of the meteorite are estimated. *Subject Headings:* **Meteor explosions, Anomalous sound propagation, Great Siberian Meteor (1908).**

J–20 551.596.1

†Wegener, Alfred, **Die äussere Hörbarkeitszone.** [The outer audibility zone.] *Zeitschrift für Geophysik*, 1:297–314, **1925.** fig., tables, 57 refs., equations. **DWB**—Very complete account of outer audibility zones after cannonading, explosions, volcanic eruptions, meteor explosions, etc. Critical discussion of various explanations of this phenomenon. Found that in central Europe the distance of the maximum sound intensity from the source varies between 120 km. in February and about 240 km. in August. *Subject Headings:* **Audibility zones, Anomalous sound propagation, Europe.**

J–21 551.596.1

Wegener, Alfred, **Die äussere Hörbarkeitszone und ihre periodische Verlagerung im Jahreslauf.** [The outer audibility zone and its periodical annual variations.] *Meteorologische Zeitschrift*, 42:261–266, **1925.** fig., 2 tables, 17 refs. **DWB**—Distances at which sounds from explosions at

Lyon (1918), Vergiate (1920) and Witten-Annen (1906) were audible by anomalous propagation in different seasons are compared. Various explanations offered. *Subject Headings:* **Anomalous sound propagation, Seasonal variations.**

J–22 551.596.1

Wiechert, E., **Bemerkungen über die anormale Schallausbreitung in der Luft. Teil I.** [Remarks on the abnormal propagation of sound in the air. Pt. I.] *Gesellschaft der Wissenschaften, Göttingen, Nachrichten, Math.-Physik. Klasse,* No. 1:49–69, **1925.** 5 tables, 12 refs., 11 equations. **DLC**—Refraction and difference of speed of sound waves in layers of stratosphere discussed, and explanation of abnormal audibility zones given, depending on actual layers of the stratosphere and wind conditions. Temperature considered important in view of the new Lindemann-Dobson theory of warm upper air conditions. **Parts 2 and 3.** *Ibid.* No. 2:93–103, 201–211, 1926. figs., tables. **DLC**—*Subject Heading:* **Anomalous sound propagation.**

J–23 551.596.1

Witkiewicz, W. J., **Études scientifiques de l'atmosphère.** [Scientific studies of the atmosphere.] *Éditions de l'Observatoire Aérologique de Moscou,* 2:14–42, **1925.** (Unchecked)—Analysis of explosions at Moscow May 9, 1920, showing symmetrical formation of outer audibility zones. *Subject Headings:* **Audibility zones, Moscow explosion (1920).**

J–24 551.596.1

Angenheister, G., **Das Problem der Schallausbreitung.** [The problem of sound propagation.] *Meteorologische Zeitschrift,* 43:467–471, **1926.** **DWB**—Review of some of early observations of the Notgemeinschaft Deutscher Wissenschaft research in acoustical phenomena from scientific series of explosions. *Subject Headings:* **Anomalous sound propagation, German explosions.**

J–25 551.596.1:551.524.7

†Gutenberg, B., **Die Entstehung der anormalen Schallzonen bei Explosionen.** [The formation of abnormal zones of sound from explosions.] *Zeitschrift für Geophysik,* 2:260–266, **1926.** 2 figs. table, 21 refs., equations. **DLC**—Discussion of the Lindemann-Dobson discovery of warm temperatures above 35 km. considering particularly implications with regards to anomalous propagation of sound. *Subject Headings:* **Anomalous sound propagation, Upper air temperatures.**

J–26 551.596.1

Gutenberg, B., **Über die Ausbreitung des Schalles in der Atmosphäre.** [On the propagation of sound in the atmosphere.] *Naturwissenschaften,* 14:338–342, **1926.** 5 figs., 9 refs., equations. **DLC**—Zone of silence after the Oppau explosion illustrated. Brief discussion of von dem Borne's, Wegener's, Angenheister's, etc., theories of anomalous sound propagation. Figure shows paths of sound waves and speeds at different heights in atmosphere. Theory of high upper air temperature treated briefly. *Subject Headings:* **Anomalous sound propagation, Upper air temperatures, Oppau explosion (1921).**

J–27 551.596.1

Gutenberg, B., **Die Schallgeschwindigkeit in den untersten Schichten der Atmosphäre.** [The speed of sound in the lowest layers of the atmosphere.] *Zeitschrift für Geophysik,* 2:101–106, 1926. fig., 2 tables, 6 equations. **DLC**—Theoretical article gives method for calculating speed of sound in the atmosphere; speed of sound is calculated up to 70 km. and from that deductions on the abnormal zone of audibility are indicated. *Subject Headings:* **Sound velocity, Audibility zones.**

J–28 551.596.1

Ritter, F., **Beitrag zur Beobachtung der durch die Sprengungen bei La Courtine im Mai 1924 erzeugten Schallwellen.** [Contribution to the observation of the sound wave caused by the explosion at La Courtine, May 1924.] *Zeitschrift für Technische Physik,* 7(3):152–154, **1926.** figs., equations. **DLC**—Sound and pressure waves produced by explosions at La Courtine were recorded at Berlin. Distance from the source of the waves was determined at 1162 km. *Subject Headings:* **Anomalous sound propagation, Explosion waves, La Courtine explosion (1924).**

J–29 551.596.1:551.590.2

Whipple, F. J. W., **The detonating meteor of October 2nd, 1926.** *Meteorological Magazine, London,* 61:253–258, 1926 fig., 3 refs. **DLC**—Details of the occurrence presented with idea of investigating upper air temperatures. Some not completely satisfactory evidence of audibility in an outer zone is shown. **Note on the detonating meteor.** *Ibid.,* 62:12, 1927. *Subject Headings:* **Meteor explosions, Audibility zones.**

J–30 551.596.1

Wiechert, E., **Die anormale Schallausbreitung als Mittel der Erforschung der Stratosphäre.** [Abnormal propagation of sound as a means of stratosphere investigation.] *Zeitschrift für Geophysik*, 2:92–101, 1926. **DLC**—Calculations made on speed of sound at different heights, considering temperatures, winter and summer, density of atmospheric layers, wind, etc. Equations formulated and results of research tabulated. *Subject Headings:* **Anomalous sound propagation, Structure of stratosphere.**

J–31 551.596.1

Wiechert, E., **Über die Schallausbreitung in der Atmosphäre.** [On sound propagation in the atmosphere.] *Meteorologische Zeitschrift*, 43:81–91, 1926. 2 figs., 10 refs., 6 equations. **DWB**—Inner and outer audibility zones described, along with normal and abnormal sound waves. Examples of anomalous sound propagation observations given for different observers after eight various large explosions; distance and speed of travel of waves considered. Theory explained with references and equations. Effect of wind considered, and examples cited showing influence of wind on audibility after different explosions. *Subject Headings:* **Anomalous sound propagation, Sound propagation, Audibility zones.**

J–32 551.596.1

Witkiewicz, W. J., **Über die Zonen der Hörbarkeit von Explosionswellen.** [On the zones of audibility from explosion waves.] *Meteorologische Zeitschrift*, 43:91–96, 1926. 3 figs., table, 9 equations. **DWB**—Moscow explosions, May 1920, discussed. Barograph records and zones of audibility shown. Theories and equations offered concerning various meteorological influences on the acoustic phenomena. *Subject Headings:* **Explosion waves, Audibility zones, Moscow explosion (1920).**

J–33 551.590.25:551.596.1

Whipple, F. J. W., **The detonating meteor of 1926, Sept. 6; an instance of an outer zone of audibility.** *Royal Astronomical Society, London, Monthly Notices, Geophysical Supplement*, 2:89–96, 1928. 3 figs., 4 refs. **DLC**—Evidence set out of an outer zone of audibility in the case of this detonating meteor. Observations analyzed to derive information with regard to the velocity of sound in the upper atmosphere. No final conclusions on this problem, but observations are valuable for areas in which there were audible detonations. Figures show hypothetical sound rays from sources 32 and 40 km. above ground. Zones of silence and of normal and abnormal audibility are discussed, and further evidence provided for the existence of high temperatures in a certain region of the upper atmosphere. *Subject Headings:* **Meteor explosions, Aubidility zones, Anomalous sound propagation, Upper air temperatures.**

J–34 551.596.1:551.510.53

†Benndorf, H., **Über die experimentelle Erforschbarkeit der höheren Schichten der Atmosphäre.** [On experimental investigations of the upper layers of the atmosphere.] **I. Sondierung der Atmosphäre mittels Schallstrahlen.** [Sounding of the atmosphere by sound waves.] *Physikalische Zeitschrift*, 30(4–5):97–115, 1929. 7 figs., 2 tables, 46 refs., 31 equations. **DLC**—Compact review given of investigations of the free atmosphere considering movement, temperature, pressure, thickness, composition, ionization, electrical properties, etc. Indicated that sound propagation could be used for many types of investigations of the atmosphere. Importance of the effect of temperature and wind on velocity and conditions of sound propagation is stressed, and equations given. Good theoretical article. *Subject Headings:* **Anomalous sound propagation, Structure of stratosphere, Acoustical sounding.**

J–35 551.510.53:551.596.1

Duckert, P., **Das Studium der Explosionswellenausbreitung als aerologisches Hilfsmittel zur Erforschung der höheren Atmosphärenschichten.** [The study of explosion waves as aerological means for investigation of the higher atmosphere layers.] *Meteorologische Zeitschrift*, 46:455–461, 1929. 2 figs., equations. **DWB**—Discussion of acoustical sounding methods, theories, and applications for upper air research. Effects of temperature and wind on speed of sound considered. *Subject Headings:* **Explosion waves, Structure of stratosphere, Acoustical phenomena.**

J–36 551.596.1:551.510.53

†*Hergesell, H. and Duckert, P., **Die Ergebnisse der Sprengungen zu Forschungszwecken in Deutschland vom 1. April 1923 bis zum 30. September 1926.** [Experimental explosions carried out in Germany from April 1, 1923, to Sept. 30, 1926.] *Lindenberg, Preussisches Aeronautisches Observatorium, Arbeiten*, 16:B–1–55, 1929. *Ibid.*, p. D–1–32. 17 extensive tables, 176 refs., 5 equations. **DLC**—Detailed records of sound propagation from a series of explosions produced experi-

mentally in Germany, and some aerological data are presented. Anomalous sound propagation i attributed to the existence of temperature layers in the upper air. *Subject Headings:* **Structur of stratosphere, Anomalous sound propagation, German explosions.**

J–37 551.596.

Meisser, O., **Schallausbreitung in der Atmosphäre bei künstlichen Sprengungen.** [Soun propagation in the atmosphere after artificial explosions.] *Physikalische Zeitschrift*, 30:170–175 **1929.** 7 figs., refs., 5 equations. **DLC**—Partial review of German series of explosions to investigat acoustical phenomena and theories of audibility regions of atmosphere. (*See item* J–58.) *Subjec Headings:* **Sound propagation, Audibility zones, German explosions.**

J–38 551.596.

Whipple, F. J. W., **Researches on the transmission of air waves at great distances.** *Beiträg zur Geophysik*, 24:72–75, **1929.** table. **DLC**—Said that air wave transmission over great distance may be due to high temperatures in the upper air. Brief report of some of British investigation o this matter given. Table shows mean passage of air waves from Isle of Grain to various point together with measurements of ozone. No obvious relation seen between time of passage of wave and amount of ozone or the meteorological conditions. Calculations can be made on temperature of upper air by using angle of descent of air wave. Audibility of meteors briefly considered. *Subjec Headings:* **Upper air temperatures, Sound velocity, Anomalous sound propagation, Ozone.**

1930–1939

J–39 551.596.1:551.524.

Gutenberg, B., **Schallgeschwindigkeit und Temperatur in der Stratosphäre.** [Speed of soun and temperature in the stratosphere.] *Beiträge zur Geophysik*, 27:217–225, **1930.** 3 figs., table 6 refs., 11 equations. English summary. **DLC**—Theoretical article gives method of calculatio for finding sound velocity in stratosphere and thus for calculating temperature there. The reckonin process begins with determinations of incident angles of the abnormal sound rays as they strike th earth. Results from registering of air waves show that height at which temperature and velocit of sound begin to increase is not always the same. *Subject Headings:* **Sound velocity, Upper a temperatures, Acoustical sounding.**

J–40 551.596.

†Meisser, O., **Luftseismik.** [Air seismology.] *Handbuch der Experimentalphysik*, (Ed. b Wilhelm Wien), 25, Pt. 3:211–251, **1930,** 30 figs., tables, refs., 51 equations. **DLC**—Calculation of speed of sound made through air layers by seismic method. Results of acoustic observations a discussed and sound paths calculated theoretically. Study of physics of sound speeds at variou altitudes gives further contribution to knowledge of construction of atmosphere. Detailed theoret cal treatment is made of sound propagation in still air and in moving air. Sound speed at differen temperatures and in different gases considered. Sound registering apparatus described. Result of scientific explosions given: normal and abnormal propagation; gases and temperatures of th stratosphere discussed. *Subject Headings:* **Sound propagation, Structure of stratosphere, Acoustic phenomena.**

J–41 551.596.

†Sandmann, B., **Beiträge zur Schallfortpflanzung im besonderen zur Schallbeugung und anomale Schallfortpflanzung.** [Contributions to propagation of sound in particular to sound diffractio and anomalous propagation of sound.] *Beiträge zur Geophysik*, 28:241–278, **1930.** 18 figs., tabl 39 refs., equations. English summary. **DLC**—The conditions which cause diffraction of sound i the free atmosphere are discussed. Meteorological conditions are treated at length in conjunctio with sound propagation. Sections discuss: sound refraction in the air; dependence of sound in tensity on meteorological conditions; refraction in relation to a zone of silence; favorable condition for sound refraction at great heights in the atmosphere; further confirmation of the assumptio of sound refractions as cause of anomalous propagation. *Subject Headings:* **Anomalous sou propagation, Audibility zones, Upper air analysis.**

J–42 551.590.2

†Whipple, F. J. W., **The Great Siberian Meteor and the waves, seismic and aerial, which produced.** *Royal Meteorological Society, Quarterly Journal*, 56:287–304, **1930.** 4 figs., tables, 15 refs., equations. **DLC**—Six microbarograms show pressure oscillations at British stations, June 3 1908, the day of the fall of the Great Meteor north of Kansk, Siberia. Brief descriptive accounts the time are translated from the Russian. The geologist, Kulik's investigation in 1921 is noted, a accounts from local sources on the meteor's appearance. The pressure and sound waves are report

as breaking windows, sucking up clods of earth, felling trees, etc. Seismological records are given for Irkutsk, Tashkent, Tiflis, and Jena, and reports of the shock as it was felt in surrounding regions. The microbarograms made in England are analyzed as to time, speed of travel of wave. The rate of travel of the air waves is discussed; equations given for calculations of the energy of the air waves. *Subject Headings:* **Meteor explosions, Acoustical phenomena, Great Siberian Meteor (1908).**

J–43 551.596.1:551.510.53

†Duckert, P., **Über die Ausbreitung von Explosionswellen in der Erdatmosphäre.** [On the spread of explosion waves in the earth's atmosphere.] *Ergebnisse der kosmischen Physik*, 1:236–290, **1931.** 16 figs., tables, 193 refs., 56 equations. **DLC**—Various aspects of the theory of longitudinal waves in the atmosphere are taken up: the propagation speed of longitudinal waves in a gas; the spread of explosion waves in a calm, even and horizontally stratified medium, in a windy such medium; in any stratified medium. Special solutions by differential equations are worked out for determining ray paths. Report given of research on explosion wave propagation by systematic detonations, instruments, methods, etc. Practical results of pressure registering and conclusions as to the construction of the atmosphere, including results of pure acoustical observations, given. Possible explanation for the high speed of sound in the upper stratosphere, and high temperatures there, outlined. Importance of air sounding stressed in aerologic research. Highly theoretical article. *Subject Headings:* **Explosion waves, Acoustical phenomena, Acoustical sounding.**

J–44 551.596.1

Galbrun, Henri, **Propagation d'une onde sonore dans l'atmosphère et théorie des zones de silence.** [Propagation of a sound wave in the atmosphere and the theory of zones of silence.] Paris, Gauthier-Villars et C^{ie}, **1931.** 352 p. 68 figs., numerous equations. **DWB**—Detailed theoretical work taking up study of effects of wind on sound propagation. First part considers discontinuity in the movement of a fluid in relation to propagation of sound. Physics of sound waves and rays discussed at length. Second part considers zones of silence, giving detailed analysis and physical and geometrical aspects. *Subject Headings:* **Sound propagation, Audibility zones, Winds.**

J–45 551.596.1:551.510.53

Whipple, F. J. W., **The investigation of air waves from explosions. Progress in England.** *Royal Meteorological Society, Quarterly Journal*, 57:331–335, **1931.** fig., 2 tables. **DLC**—Table gives results of observations of air waves from gunfire in England, giving distance, time of passage, average angle of descent, etc. Principle object of investigation is to determine conditions in upper atmosphere. Another table shows velocity of transmission of the waves at heights from 40 to 55 km. together with the apparent temperature. *Also:* **The propagation to great distances of airwaves from gunfire. Progress of the investigation during 1931.** *Ibid.*, 58:471–478, 1932. fig., 2 tables, ref. **DLC**—Report of further trials made in 1931. *Subject Headings:* **Explosion waves, Acoustical phenomena, Structure of stratosphere, Acoustical sounding.**

J–46 551.596.1:551.510.53

Gutenberg, B., **Mit welcher Genauigkeit lässt sich die Schallgeschwindigkeit in der Stratosphäre finden?** [With what accuracy can the speed of sound in the stratosphere be determined?] *Beiträge zur Geophysik*, 35:46–50, **1932.** table, 4 refs. **DLC**—Method for calculating temperature by sound propagation study described; theories of Whipple and Meisser briefly considered and compared. *Subject Headings:* **Sound velocity, Anomalous sound propagation, Upper air temperatures.**

J–47 551.596.1

†*Gutenberg, Beno, **Die Schallausbreitung in der Atmosphäre.** [Propagation of sound in the atmosphere.] *Handbuch der Geophysik*, 9:89–145, **1932.** 25 figs., tables, refs., 158 equations. **DWB**—Thorough study with extensive discussion of instruments, theories, relation of atmospheric composition, wind and temperature aspects, etc., involved in study of normal and anomalous sound propagation. Much data and many illustrations are included, as well as thorough references. *Subject Headings:* **Sound propagation, Anomalous sound propagation.**

J–48 551.596.1

Kölzer, J., **Beobachtungsergebnisse über Schallausbreitung auf nahe Entfernungen und Schlussfolgerungen zum Problem der anomalen Schallausbreitung.** [Observational results on sound propagation for short distances and conclusions on the problem of anomalous propagation of sound.] *Berlin, Preussisches Meteorologisches Institut, Abhandlungen*, 10, No. 1, **1932.** 27 p. 22 figs., 9 tables, refs. **DWB**—Theories on speed of sound, anomalous propagation, etc., discussed in detail, considering meteorological conditions, instrument records, and observational data. *Subject Headings:* **Sound velocity, Anomalous sound propagation.**

J–49 551.510.53

†Bartels, J., **Fizika vysokikh sloev atmosfery.** [Physics of the high layers of the atmosphere.] *Uspekhi Fizicheskikh Nauk*, 13(5):689–751, **1933.** 42 figs., 2 tables, 150 refs. **DLC**—Brief summary of knowledge of stratospheric temperatures obtained from acoustical soundings, correlated in this progress report of upper atmospheric knowledge with data obtained by other methods in upper air research. Excellent bibliography of upper air phenomena: aerology, twilight, light of night sky, meteors, ozone, sound, ionization, etc. *Subject Headings:* **Upper air analysis, Acoustical sounding.**

J–50 551.596.1

Kneser, Hans O., **The interpretation of the anomalous sound-absorption in air and oxygen in terms of molecular collisions.** *Acoustical Society of America, Journal*, 5:122–126, Oct. **1933.** 3 figs. table, 3 refs., numerous equations. **DBS**—The anomalous sound absorption in moist air discovered by V. O. Knudsen cannot be explained on the basis of the classical theory of Rayleigh, Kirchhoff and Stokes. Further facts and theories presented. *Subject Headings:* **Acoustical phenomena, Sound absorption.**

J–51 551.596.1

Tucker, W. S., **Meteorological acoustics.** *Royal Meteorological Society, Quarterly Journal*, 59:203–216, July **1933.** table, 14 refs., equations. *Also:* Note, *Ibid.*, p. 360. **DWB**—Broad general article on various aspects of acoustics in relation to meteorology: location of sounds; velocity of sound in still air and the acoustical field; consideration of effects of wind and temperature; anomalous propagation of sound; zones of silence; refraction phenomena based on stratification of the atmosphere; problems of attenuation of sound, etc. *Subject Heading:* **Acoustical phenomena.**

J–52 551.596.1 551.510.53

Andreev, N. N., **O programme dal'neishikh rabot po akusticheskomu issledovaniiu stratosfery i izucheniiu akustik svobodnoĭ atmosfery.** [The program of further acoustical investigation of the stratosphere and the study of the acoustics of the free atmosphere.] *Akademiia Nauk, SSSR, Trudy, Vsesoiuznoĭ Konferentsii po Izucheniiu Stratosfery*, p. 145–151, **1934.** 12 refs. **DLC**—In translation: **Proceedings of the All-Union Conference for the Study of the Stratosphere.** Moscow-Leningrad, p. 105–111, 1938. **DLC**—General problems of acoustics discussed. Some supplementary factors to be considered are gravity, rotational forces of the earth, wind, dust, absorption and reflection of sound, and most important, temperature. *Subject Headings:* **Acoustical sounding, Upper air analysis.**

J–53 551.596.

Belov, A. I., **Teoriia akusticheskogo zondirovaniia atmosfery i experimental'nyĭ material do 1932 goda.** [Theory of the acoustical sounding of the atmosphere and experimental material before 1932.] *Akademiia Nauk, SSSR, Trudy, Vesesoiuznoĭ Konferentsii po Izucheniiu Stratosfery*, p. 125–138, **1934.** 6 figs., table, 15 refs., equations. **DLC**—Review given of observations of sound propagation after powerful explosions from 1920 to 1932. Aerological observations and the propagation of sound analyzed; scheme and instruments for further investigations outlined. Hypotheses suggested in the study of the acoustical phenomena, along with critical consideration of results of investigations. *Subject Headings:* **Acoustical sounding, Structure of stratosphere.**

J–54 551.596.

*§Duckert, Paul, **Ergebnisse der Hörbeobachtungen des Sprengversuchs in Oldebroek am 15 Dezember 1932.** [Results of acoustical observations from explosions at Oldebroek, Dec. 15, 1932.] *Zeitschrift für Geophysik*, 10:119, **1934.** fig., ref. **DWB**—Detailed discussion of explosion and subsequent sound records. Figure shows zones of aubibility and where explosion waves were recorded. **Die Wetterlage und die Schichtung der Atmosphäre am 15. Dez. 1932., dem Sprengtag von Oldebroek.** [Weather conditions and layers of the atmosphere on Dec. 15, 1932, the day of the Oldebroek explosion.] *Ibid.*, 127–144. 4 tables, 3 figs. Tables show temperature, pressure, humidity, wind and upper air wind measurements at different stations of northwestern Europe along with sound wave speeds. **Ergebnisse der Registrierungen von Schallwellen an kreisförmig um den Sprengher angeordneten Stationen.** [Results of registering sound waves at stations placed circularly around the center of explosion.] *Ibid.*, p. 197–200. *Subject Headings:* **Acoustical phenomena, Audibility zones, Oldebroek explosion (1932).**

J–55 551.596.1:551.510.53(98

Freimann, L. S., **Opyty po akusticheskomu zondirovaniiu stratosfery v Arktike v techenie 2-go mezhdunarodnogo poliarnogo goda.** [Experiments in acoustical sounding of the stratosphere in the Arctic during the second polar year.] *Akademiia Nauk, SSSR, Trudy Vsesoiuznoĭ Konferentsii po Izucheniiu Stratosfery*, p. 139–144, **1934.** table. **DLC**—In translation: **Proceedings of the All**

Union Conference for the Study of the Stratosphere. Moscow-Leningrad, p. 99–104, 1938. **DLC**—Results reported of the 1932–1933 investigations on the acoustical sounding of the stratosphere in the northern polar basin, where 28 special explosions were set off. Author determines anomalous sound propagation in the atmosphere even without light for some weeks; remarks on influence of wind and temperature. *Subject Headings:* **Acoustical sounding, Arctic.**

J–56 551.596.1

*Jung, Heinrich, **Berechnung der Laufzeitkurven des anormalen Schalles für windstille Atmosphäre und Vergleich mit der Laufzeitkurve der Oldebroek-Sprengung vom 15. Dez. 1932.** [Calculation of the time curve of the path of anomalous sound waves for a calm atmosphere and comparison with the time path curve of the Oldebroek explosion, Dec. 15, 1932.] *Zeitschrift für Geophysik*, 10:186–196, 1934. 6 figs., 4 tables, refs., equations. **DWB**—*Subject Headings:* **Anomalous sound propagation, Oldebroek explosion (1932).**

J–57 551.596.1

†Kölzer, Joseph, **Zur Frage der anomalen Schallausbreitung.** [Questions of anomalous sound propagation.] *Zeitschrift für Geophysik*, 10:215–221, 1934. 16 refs. **DWB**—Review of various theories with good references. High temperature theory of upper atmosphere favored. Importance of sound propagation study in aerologic research stressed. *Subject Headings:* **Anomalous sound propagation, Upper air analysis.**

J–58 551.596.1

*Meisser, O., Martin, H., et al, **Materialzusammenstellung der Schallregistrierungen während der Sprengungen in Oldebroek, Holland.** [Collection of material on sound wave records during the explosion in Oldebroek, Holland.] *Zeitschrift für Geophysik*, 10:145–158, 1934. 5 figs., 7 tables. **DWB**—Records for different stations tabulated and illustrated. **Beiträge zu den Luftschallmessungen.** [Contributions to the sound measurements of the air.] *Ibid.*, p. 158–166, 1934. 8 figs., table, 6 equations. **DWB**—Time records, instrument traces, etc. *Subject Headings:* **Acoustical phenomena, Acoustical sounding, Oldebroek explosion (1932).**

J–59 551.596.1

*Regula, Herbert, **Schallausbreitung in der Atmosphäre.** [Sound propagation in the atmosphere.] *Zeitschrift für Geophysik*, 10:167–185, 1934. 12 figs., 6 tables, refs., equation. **DWB**—Results briefly discussed of sound records of explosions 1923–1929, at Geophysical Institute, Göttingen. Possibility suggested of measuring upper air winds by sound measurements. Conception of the construction of the atmosphere given. Results of the Oldebroek explosion applied. *Subject Headings:* **Anomalous sound propagation, German explosions (1923–1929), Acoustical sounding.**

J–60 551.596.1

*Sandmann, B., **Beobachtungsergebnisse über den Einfluss der "akustischen Umkehrschicht" auf Schallausbreitung.** [Observational results on the influence of the acoustic refraction layer on the propagation of sound.] *Zeitschrift für Geophysik*, 10:200–215, 1934. 6 figs., 9 tables, 15 refs., equations. **DWB**—Detailed, well-illustrated investigation. *Subject Headings:* **Acoustical phenomena, Anomalous sound propagation.**

J–61 551.590.25

Whipple, F. J. W., **On phenomena related to the Great Siberian Meteor.** *Royal Meteorological Society, Quarterly Journal*, 60:505–513, 1934. fig., table, 9 refs., equations. **DLC**—Supplementary paper to 1930 work of this author. (*See item* J–42.) Air wave records are tabulated for additional European stations, as well as for Batavia and Washington. Barograms reproduced. Records are discussed and velocities of propagation of waves travelling in different directions compared. Additional evidence given with regard to illumination of sky during the nights following the meteor. Discussion of shock waves by S. K. Banerji included with equations. *Subject Headings:* **Meteor explosions, Acoustical phenomena, Great Siberian Meteor (1908).**

J–62 551.596.1(98)

*Wölcken, K., **Schalluntersuchungen im Polargebiet.** [Sound research in polar regions.] *Zeitschrift für Geophysik*, 10:224–234, 1934. 9 figs., tables, refs. **DWB**—Observations recorded of abnormal sounds during the winter solstice at 76°N lat. during polar year, 1932–1933. Observations tabulated and microbarograph registerings reproduced. Differences in summer and winter in directions, frequency and forms of sound waves noted. Recording stations were located on Franz Josef Land and Novaya Zemlya. *Subject Headings:* **Anomalous sound propagation, Arctic.**

J–63 551.596.1

Gutin, L. **Zur Akustik der Atmosphäre.** [Acoustics of the atmosphere.] *Physikalische Zeitschrift der Sowjetunion*, 8:71–80, **1935.** 5 figs., table, refs., 170 equations. **DLC**—Abstract by E. Lübcke in *Zeitschrift für Geophysik, Geophysikalische Berichte*, 12:29, 1936. **DWB**—Need for consideration of sound curves and damping stressed, more than merely geometrical aspects in study of sound propagation. *Subject Headings:* **Acoustical phenomena, Sound propagation, Sound absorption.**

J–64 551.510.53:551.596.1

Ramanathan, K. R., **Exploration of the upper atmosphere by means of sound waves.** *Current Science*, 4:140–142, **1935.** (Unchecked)—*Subject Headings:* **Anomalous sound propagation, Upper air analysis, Acoustical sounding.**

J–65 551.596.1

Sakai, Takuzô, **A new theory of the anomalous propagation of sound waves at a short distance.** *Physico-Mathematical Society of Japan, Proceedings*, 3rd Ser., 17(7):240–273, **1935.** (Unchecked in original.) Abstract by E. Lübcke, *Zeitschrift für Geophysik, Geophysikalische Berichte*, 12:29, 1936. **DWB**—*Subject Heading:* **Anomalous sound propagation.**

J–66 551.510.53:551.596.1

Wegener, K., **Die Schallstrahlen in der Stratosphäre.** [Sound waves in the stratosphere.] *Meteorologische Zeitschrift*, 52:504–505, **1935.** 5 refs. **DWB**—Brief discussion of stratosphere investigations by sound waves. *Subject Headings:* **Anomalous sound propagation, Structure of stratosphere, Acoustical sounding.**

J–67 551.596.1

Whipple, F. J. W., **The propagation of sound to great distances.** *Royal Meteorological Society Quarterly Journal*, 61:285–308, **1935.** 16 figs., 10 refs. **DLC**—Inner and outer zones of audibility differentiated. Maps are given illustrating the audibility of explosions which occurred at various places: Boden, Sweden, Jan. 11, 1933; and others in India and England. Reproductions of instrumental records of sound and explosion waves are analyzed. Discussion follows of how angles of descent are estimated. Methods outlined for calculating times of passage of air waves, velocities of the waves, and heights of the trajectories. The Oldebroek explosions of Dec. 1932 are discussed as examples of conditions in winter. Diagrams show the velocity of waves according to temperature etc., and trajectories of waves towards the east. Monsoon winds in the upper air are considered as well as distribution of temperature over globe; passage of waves through rarefied atmosphere absorption of sound in atmosphere; and possibility of explaining high temperatures of upper atmosphere by meridional transfer of air masses in upper atmosphere opposite in direction to that at low altitudes. *Subject Headings:* **Audibility zones, Sound propagation, Upper air analysis, Oldebroek explosion (1932), Boden (Sweden) explosion (1933).**

J–68 551.510.534:551.596.1

Penndorf, R., **Anomale Schallausbreitung und Ozonosphäre.** [Anomalous sound propagation and the ozonosphere.] *Zeitschrift für Geophysik*, 12:315–321, **1936.** 6 figs., 5 refs. **DWB**—Sounding of upper air by anomalous propagation discussed. Effect of ozone on temperature at 35–50 km. pointed out, as well as changes in distribution of temperature in summer and winter in stratosphere over Arctic and central Europe and consequent variations in wind directions. *Subject Headings:* **Anomalous sound propagation, Ozonosphere.**

J–69 551.551:551.596.1

Dahl, H. and Devik, O., **Effect of turbulence on the propagation of sound.** *Nature, London*, 139:550–551, **1937.** fig., 2 refs. **DLC**—Results of study of attenuation of sound at sea surface suggest that study of attenuation of a sound spectrum in open air might furnish a method for studying turbulence of the air. *Subject Headings:* **Acoustical phenomena, Sound propagation, Turbulence.**

J–70 551.571:551.596.1

Brandt, O., **Über den Einfluss des Wasserdampf- und Nebelgehaltes der Luft auf die Absorption von Schall- und Ultraschallstrahlen.** [On the influence of water vapor and fog content of the air on the absorption of sound and ultrasonic waves.] *Meteorologische Zeitschrift*, 55:350–354, **1938.** 4 figs., 7 refs., equations. **DWB**—Effects of weather conditions on sound absorption stressed and particularly the importance of humidity and fog content. Brief treatment of propagation of ultrasonic waves. *Subject Headings:* **Sound absorption, Humidity, Acoustical phenomena, Ultrasonics.**

J–71 551.508:551.596.1

Gutenberg, B., **The velocity of sound-waves from gun-fire in Southern California.** *American Geophysical Union, Transactions*, p. 156, **1938.** 2 figs. **DLC**—Description of a sensitive instrument for recording changes in air pressure. Sound waves recorded by this short period Benioff barograph shown. *Subject Headings:* **Acoustical phenomena, Barographs, Pressure oscillations.**

J–72 551.590.25:551.541:551.596

Kulik, L. A., **The meteorite of June 30, 1908, in central Siberia.** *Astronomical Society of the Pacific, Leaflet* 109, March **1938.** 7 p. **DLC**—Report of expedition to the place of occurrence. Description of air waves, in immediate vicinity and as recorded on microbarographs in Europe, though no actual data given. *Subject Headings:* **Meteor explosions, Explosion waves, Great Siberian Meteor (1908).**

J–73 551.596.1

Sänger, R., **Artillerische Schallmessung. 1. Schallausbreitung in der Atmosphäre und Auswertverfahren.** [Measurements of sounds from artillery. 1. Sound propagation in the atmosphere and procedure for calculations.] Zurich, H. Böniger, **1938.** 64 p. (Unchecked)—*Subject Heading:* **Sound propagation.**

J–74 551.596.1

Waetzmann, E., **Zur Ausbreitung in der Atmosphäre.** [Propagation in the atmosphere.] *Akustische Zeitschrift*, 3:245–249, **1938.** (Unchecked)—*Subject Heading:* **Sound propagation.**

J–75 551.596.1:551.524.7

Gutenberg, B., **The velocity of sound waves and the temperature in the stratosphere in Southern California.** *American Meteorological Society, Bulletin*, 20:192–201, **1939.** 6 figs., 6 refs., 4 equations. **DWB**—Sound waves from gunfire in Southern California, about 33°N lat., show travel times similar to those observed in Europe and Novaya Zemlya. Concluded that increase in temperature at 30 to 40 km. altitude is approximately the same in these regions. *Subject Headings:* **Sound velocity, Upper air temperatures, Southern California, Arctic.**

J–76 551.541

Pekeris, C. L., **The propagation of a pulse in the atmosphere.** *Royal Society of London, Proceedings, A*, 171:434–449, **1939.** 3 figs., 2 tables, 10 refs., 26 equations. **DLC**—Highly theoretical discussion of the propagation of waves whose period is about an hour. As a result of theoretical deductions the conclusion is drawn that in so far as can be expected, the evidence from the Krakatoa wave is in favor of rather than in contradiction to the existence of the second mode. In appendix there is given the distribution with height of the vertical velocities in the two modes of oscillation of a model atmosphere. At heights of the order of 100 km. these velocities are found to be in phase with the surface pressure for both modes. *Subject Headings:* **Pressure oscillations, Explosion waves, Krakatoa eruption (1883).**

J–77 551.596.1

Süring, R., **Die Schallausbreitung.** [The propagation of sound.] (In *Hann-Süring Lehrbuch der Meteorologie*, 5th ed., Vol. I. Leipzig, Willibald Keller, **1939.** p. 26–28. fig., refs., 3 equations.) **MH-BH**—Brief summary review of work and theories in normal and anomalous propagation of sound. *Subject Headings:* **Anomalous sound propagation, Sound propagation.**

1940–1944

J–78 551.596.1

†Sieg, Helmut, **Über die Schallausbreitung im Freien und ihre Abhängigkeit von den Wetterbedingungen.** [Sound propagation in the free atmosphere and its dependence on weather conditions.] *Elektrische Nachrichten-Technik*, 17:193–208, **1940.** 28 figs., tables, 30 refs., 7 equations. **DLC**—Influence of temperature, wind, etc. on propagation of sound is thoroughly investigated, but acoustical sounding of stratosphere not taken up. *Subject Heading:* **Sound propagation.**

J–79 551.596.1

Haurwitz, B., **Propagation of sound through the atmosphere.** *Journal of the Aeronautical Sciences*, 9:35–43, **1941.** 8 figs., 3 tables, 10 refs., 20 equations. **DLC**—Geometrical laws of sound propagation discussed, in a calm atmosphere, and considering wind and temperature effects. Region of audibility around a source of sound is asymmetrical according to wind. Zones of anomalous audibility around an explosion are explained by high air temperatures in upper air. *Subject Headings:* **Audibility zones, Sound propagation, Upper air temperatures.**

J–80 551.596.1:551.57

Oswatitsch, Kl., **Die Dispersion und Absorption des Schalles in Wolken.** [The dispersion an absorption of sound in clouds.] *Physikalische Zeitschrift*, 42:365–378, **1941.** 5 figs., 6 refs., 2 equations. **DLC**—Highly theoretical article. Sound waves in water clouds investigated, an equations given for their relations to air pressure and air density. *Subject Headings:* **Sound absorp tion, Acoustical phenomena, Clouds.**

J–81 551.596.1:551.524.

†Penndorf, R., **Die Temperatur der hohen Atmosphäre.** [The temperature of the upper atmos phere.] *Meteorologische Zeitschrift*, 58:1–10, **1941.** 10 figs., 2 tables, 33 refs. **DLC**—Translation C. C. Chapman, *American Meteorological Society, Bulletin*, 27:331–342, June 1946. **DLC**—A theor of high temperatures in the upper atmosphere is supported by results on anomalous sound propaga tion (only briefly discussed here), and of research on ozone and meteors, as well as by the theory o atmospheric tides. *Subject Heading:* **Upper air temperatures, Anomalous sound propagation Temperature of stratosphere.**

J–82 551.596.

Wegener, Kurt, et al, **Die Problematik der Schallfortpflanzung über grosse Entfernungen** [The problem of sound propagation over great distances.] *Meteorologische Zeitschrift*, 58:289–294 **1941.** tables, 3 refs., equations. **DLC**—Behavior of sound waves in the stratosphere is considered Sound waves said to become Riemann shock waves in the stratosphere. *Subject Headings:* **Shoc waves, Anomalous sound propagation.**

J–83 551.596.1:551.57

Gutenberg, B., **Propagation of sound waves in the atmosphere.** *Acoustical Society of America Journal*, 14:151–155, Oct. **1942.** 5 figs., table, 7 refs., 20 equations. **DLC**—The effect of humidit on the velocity of sound waves is investigated; equation and table given. The radius of curvature fo a ray of sound which is propagated in the direction of the wind is given and discussed. The ampl tudes of sound waves as a function of the distance are given with equation, and the relative import ance of the quantities involved is discussed. *Subject Headings:* **Sound propagation, Sound velocity Humidity.**—*From author's abstract.*

J–84 551.596.

Obukhov, A. M., **On propagation of sound waves in eddying flow.** *Académie des Sciences d l'URSS, Comptes Rendus*, 39(2):46–48, **1943.** 16 equations. In English. **DLC**—Differentia equations are set up and solved for acoustical propagation in turbulent air under conditions of sma change in sound velocity, and quasi-stationary flow. This is an extension of the work of Andree (1934). *Subject Headings:* **Sound propagation, Turbulence.**—*M.R.*

J–85 551.596.1:551.55

Soloveichik, R. E., **O vliianii viazkosti atmosfery na rasprostranenie zvuka.** [The influenc of the viscosity of the atmosphere on the propagation of sound.] *Akademiia Nauk, SSSR, I vestiia, Ser. Geogr. i Geofiz.*, 7(6):339–343, **1943.** fig., 2 tables, 3 refs. **DLC**—An investigation of th problem of the influence of turbulent viscosity of the propagation of sound in the earth's atmosphe is made. Investigation shows that, taking this factor into account, use should be made of a variab coefficient of turbulent viscosity depending on the length of the sound wave. Satisfactory coinc dence with experiment achieved, when the "law of 4/3," found empirically by Richardson and grounde on the theoretical work of A. M. Obukhov, is assumed for the coefficient of turbulent viscosit *Subject Headings:* **Sound propagation, Turbulence.**

J–86 551.596.1:551.55

Bronstein, I. M., **K voprosu o zatukhanii zvuka v atmosfere.** [The problem of the extinctio of sound in the atmosphere.] *Akademii Nauk, SSSR, Izvestiia, Ser. Geogr. i Geofiz.*, 8(4):151–15 **1944.** 5 refs., 8 equations. **DLC**—Author gives a quantitative determination for the coefficie of extinction of sound in the atmosphere, and shows connection between the coefficient of extinctio of sound and turbulence of the atmosphere. *Subject Headings:* **Sound absorption, Turbulence.**

1945–1947

J–87 551.596.1:551.510.5

Lindholm, F., **Propagation to great distance of airwaves from the explosion at Oslo on Decemb 19th 1943 as an indication of conditions in the upper atmosphere.** *Geografiska Annaler*, 27:241–25 **1945. MH-BH**—*Stockholm, Medd., Ser. B.* No. 3, p. 240–252, 1945. (Unchecked)—*Subje Headings:* **Anomalous sound propagation, Upper air analysis.**

J–88 551.596.1

Arabadzhi, V. I., **Ob anomal'nykh zonakh slyshimosti.** [On anomalous zones of audibility.] *Meteorologia i Gidrologia*, 5:21–31, 1946. **DLC**—Thorough, theoretical and empirical treatment leading to the following conclusions: (1) The reception of acoustical waves from the stratosphere occurs on account of inversion in refracted waves from the upper part of the inclined wave front having significant vertical extension. (2) The seasonal change in radius of zones of anomalous audibility might explain the formation during explosions in winter of acoustical waves of higher frequency than in summer. (3) The "east-west effect" might be explained by the influence of the wind regime on waves of different frequency. Strong skepticism of Whipple's theory of warm stratosphere temperatures as explanation of anomalous propagation is brought up. Sound speed through the ozone layer, about 21 km., above the earth, would decrease because ozone is triatomic. *Subject Headings:* **Acoustical phenomena, Anomalous sound propagation, Upper air analysis.**—*M.R.*

J–89 551.596.1

Drummond, A. J., **Sound waves and seismology.** *Weather*, 1:193, 214, **1946. DWB**—Brief reference to Oct. 1946 meeting of Geophysical Section of Royal Astronomical Society to discuss Burton-on-Trent explosion investigation. *Subject Headings:* **Anomalous sound propagation, Upper air analysis.**

J–90 551.541

Gutenberg, B., **Interpretation of records obtained from the New Mexico atomic bomb test, July 16, 1945.** *Seismological Society of America, Bulletin*, 36:327–330, **1946.** tables, 3 refs. **DLC**—Brief interpretation of some of records of earth and air waves after the New Mexico explosion. Some data on direct sound waves along the ground and others through the stratosphere, as recorded at various stations: Tucson, Mount Wilson, Pasadena, etc. Speculation made as to an air wave similar to Krakatoa. *Subject Headings:* **Explosion waves, Atomic explosions, New Mexico atom bomb (1945).**

J–91 551.596.1:551.510.53

Gutenberg, B., **Physical properties of the atmosphere up to 100 km.** *Journal of Meteorology*, 3:27–30, June **1946.** 5 figs., 26 refs., 5 equations. **DWB**—Results of new calculations of temperature, pressure, density, etc., in stratosphere up to 100 km. elevation discussed. Limited treatment and discussion of results of acoustical sounding of stratosphere. *Subject Headings:* **Acoustical sounding, Structure of stratosphere.**

J–92 551.596.1

Cox, Everett F., **Microbarometric pressures from large high explosive blasts.** *Acoustical Society of America, Journal*, 19(5):832–846, Sept. **1947.** 14 figs., 2 tables, 28 refs. **DLC**—Discussion of measurements of anomalous and normal pressure waves produced by blasts near Arco, Idaho, during Oct. 1946, and recorded on microbarographs at distances of from 13 to 452 km. Author concludes that abnormal audibility is not a shockwave phenomenon. *Subject Headings:* **Acoustical phenomena, Anomalous sound propagation, Shock waves.**

J–93 551.596.1

†*Murgatroyd, R. J., **Anomalous sound reception experiments.** *London, Air Ministry, Meteorological Research Committee, M.R.P.* No. 346, May **1947.** 19 p. 7 figs., 3 tables, 26 refs. **DWB**—Results of 16 experiments in England between April, 1944, and April, 1945, in which recordings of sound received by anomalous paths from large explosions were utilized to obtain data on upper air winds and temperatures. Methods used and their limitations outlined. Results tabulated. *Subject Headings:* **Anomalous sound propagation, Acoustical sounding, England.**—*From author's abstract.*

J–94 551.596.1

Richardson, E. G., **Sound and the weather. I.** *Weather*, 2:169–173, **1947. Part II.** *Ibid.*, 2:205–210, 1947. 6 figs. Comment by P. Rothwell and reply by E. G. Richardson. *Ibid.*, 3:84, 1948. **DWB**—Some of results of British research. Considers noises caused by meteorological agencies and the propagation of sound, both normal and abnormal. *Subject Headings:* **Acoustical phenomena, Anomalous sound propagation, England.**

J–95 551.596.1

Rothwell, P., **Calculation of sound rays in the atmosphere.** *Acoustical Society of America, Journal*, 19:205–221, **1947.** 15 figs., 2 tables, 2 refs., 6 equations. **DLC**—Highly theoretical work in which methods of calculation which were developed for tracing sound rays in the study of observations of acoustical methods of aircraft location are described, with a view to their possible application to other meteorological investigations by acoustic methods. Tables have been constructed to be

useful for meteorological investigations of the upper atmosphere, covering range of temperatu from ground to stratosphere, range of angles of descent, and time factors, with respect to equation Procedure for calculating rays by the use of tables of range and time factors is outlined, and exampl are given. *Subject Headings:* **Acoustical phenomena, Sound rays, Acoustical sounding.**

J–96 551.596

†Schilling, H. K. and others, **Ultrasonic propagation in open air.** *Acoustical Society of Americ Journal*, 19:222–234, **1947.** 14 figs., table, 25 refs. **DLC**—Data and conclusions of practic interest in regard to ultrasonic signaling are presented. Fundamental ultrasonic phenomena propagation are investigated, and their causes isolated through correlations with simultaneous observed micrometeorological phenomena. Results are presented with two viewpoints: propagatic in a nonscattering atmosphere, and propagation in a scattering medium. Found that sometimes t open air is a scattering, as well as an absorbing medium. Values of absorption coefficients are pr sented for frequencies up to 30 kc. *Subject Headings:* **Acoustical phenomena, Ultrasonics, Soun absorption, Micrometeorology.**

J–97 551.596

Visser, S. W. and Veldkamp, J., **De Nederlandse waarnemingen van de explosie op Helgolan** [Dutch observations on the Helgoland explosion.] *Hemel en Dampkring*, 45:150–158, Sept. 194 4 figs., plate, 4 tables. **DLC**—Earlier section of article covers the seismological effects; this cove the meteorological and acoustical observations made in Holland, including abnormal sound da originating from Helgoland blast. Indicated that southwest from Helgoland the inner boundary the abnormal audibility zone may have been as close as 176 km. *Subject Headings:* **Anomalo sound propagation, Helgoland explosion (1947).**

J–98 551.510.53:551.596

*Warfield, Calvin, **Tentative tables for the properties of the upper atmosphere.** *U. S. N.A.C. Technical Notes*, No. 1200, Jan. **1947.** 53 p. 3 figs., 6 tables, 20 refs., numerous equations. **DWB** Considering all types of measurements made prior to 1947 a "tentative standard atmosphere" t to 120 km. altitude has been constructed. "Most probable," "probable," "probable minimum and "probable maximum" values are given. Among quantities listed in these tables against altitu are temperature, pressure, density, specific weight, coefficient of viscosity, speed of sound, and t mean free path of the air molecules. *Subject Headings:* **Acoustical sounding, Upper air analysis.**

1948

J–99 551.596

Cox, Everett F., **Subsonic frequency dispersion in the upper atmosphere.** *Acoustical Socie of America, Journal*, 20:549, **1948.** **DLC**—Abstract of paper read at Los Angeles meeting, De 1947. Discussion of abnormal sound data from Helgoland blast 1947. *Subject Headings:* **Acoustic phenomena, Helgoland explosion (1947).**

J–100 551.524.7:551.596

†Cox, E. F., **Upper atmosphere temperatures from remote sound measurements.** *Americ Journal of Physics*, 16:465–474, **1948.** 8 figs., 27 refs., 15 equations. **DLC**—Basic material cover mostly by Cox and others, 1949, (*see item* J–107). Good review of development of theories acoustical soundings of the atmosphere, determinations of temperature, etc. *Subject Heading* **Upper air temperatures, Acoustical sounding, Helgoland explosion (1947).**

J–101 551.590.

Fesenkov, Vasiliĭ G., **Obstoiatel'stva padeniia Sikhote-Alinskogo meteorita.** [The conc tions of falling of Sikhote-Alin meteorite.] *Akademiia Nauk, SSSR, Astronomicheskiĭ Zhurn* 15(3):190–200, **1948.** photo, table, equations. **DLC**—Reports of meteor that fell in Siberi Feb. 12, 1947. Appearance, composition, accompanying rain of iron, speed of flight, angle of fligh explosion, and sound waves and effects are discussed. No tabulated data. Comparison made wi Tungus meteorite of 1908 (the Great Siberian Meteor, 1908). *Subject Headings:* **Meteor expl sions, Acoustical phenomena, Sikhote-Alin Meteor (1947).**

J–102 551.596.1:551.5

Lindsay, R. B., **Transmission of sound through air at low pressure.** *American Journal Physics*, 16:371–377, Oct. **1948.** 5 figs., 9 refs., 46 equations. **DLC**—Survey made of the attenu tion of sound in air as a function of pressure or density. Sections discuss: wave propagation wi relaxation dissipation; viscosity and heat-conduction dissipation; calculations of Tsien and Scha berg; classical approximation for very high frequency; measurements of acoustic transmission lo in a low pressure tank. *Subject Headings:* **Pressure variations, Sound propagation.**

J–103 551.596.1:551.510.53

Melkas, A., **Über den Einfluss der Temperatur- und Windverhältnisse auf die Fortpflanzung es Schalls in der Luft.** [The influence of temperature and wind on propagation of sound in the ir.] *Geophysica, Helsinki*, 3:207–219, **1948.** 5 figs., 2 refs., 36 equations. **MH-BH**—The correc- on for direction, used in determining the position of aircraft by means of an acoustical sound de- ector, is based upon ground temperature. In order to secure greater exactness the temperature and ind conditions of the total sound path must be known. The author analyzes mathematically the nfluence of temperature gradient alone upon the rate of propagation of sound in still air and the ombined effect of temperature and horizontal wind movement upon the rate of sound propagation. quations are derived for calculating the angles of elevation for the two conditions. *Subject Head- ngs:* **Sound propagation, Acoustical sound detector, Temperature, Winds.**—*I. L. D.*

J–104 551.541

Pekeris, C. L., **The propagation of a pulse in the atmosphere. Part II.** *Physical Review*, 3(2):145–154, Jan. 15, **1948.** 4 figs., 13 refs., 65 equations. **DLC**—Discussion of the propagation a pulse, taking all frequencies into account, although exact form of the observed pulse is not redicted. Results of study are applied to interpretation of the pressure wave produced by the reat Siberian Meteor and to the pressure oscillations recorded by microbarographs in England. *ubject Headings:* **Pressure oscillations, Meteor explosions, Great Siberian Meteor (1908).**

1949

J–105 551.596.1

Arabadzhi, V. I., **O zatukhanii zvuka v atmosfere.** [On extinction of sounds in the atmosphere.] *kademiia Nauk, SSSR, Izvestiia, Ser. Geogr. i Geofiz.*, 12(2):162–164, **1949.** 4 refs., 12 equations. **WB**—Consideration of the extinction of sound due to temperature variations in the lower layers of ne atmosphere. *Subject Headings:* **Acoustical phenomena, Sound absorption.**

J–106 551.596.1

Cox, Everett F., **Abnormal audibility zones in long distance propagation through the atmosphere.** *coustical Society of America, Journal*, 21:6–16, Jan. **1949.** 8 figs., table, 16 refs., 16 equations. **LC**—Records of Helgoland explosions, April 1947, are reported and discussed. Arrival times of normal signals at six stations over 220 km. away, supplemented by high altitude meteorological ata and the assumption of negligible winds above 30 km., permit upper atmosphere temperature lculations, (maximum of 294°K in temperature hump between 30 and 70 km.). This temperature aximum establishes a critical ray which is refracted to infinity. A new explanation for observed ter boundaries of abnormal zones is therefore proposed and substantiated by recorded evidence of spersion near the temperature maximum. In the signal received near the abnormal zone outer undary, high frequency content predominates. *Subject Headings:* **Anomalous sound propagation, elgoland explosion (1947).**—*From author's abstract.*

J–107 551.596.1:551.524.7

†*Cox, E. F. and others, **Upper-atmosphere temperatures from Helgoland Big Bang.** *Journal of leteorology*, 6:300–311, Oct. **1949.** 15 figs., 6 tables, 55 refs., 5 equations. **DWB**—Interesting nalysis of acoustical and microbarometric data obtained at a series of stations extending for 1000 km. uth from Helgoland, where a giant blast occurred on April 18, 1947. Normal audibility occurred to 120 km. and abnormal audibility from 200 to 250 or perhaps 500 km. to the south of the blast. rom all available upper air soundings of temperature and wind and from data collected, the authors tempt to calculate all possible paths of abnormal sound or pressure waves, and to deduce the tem- erature profile up to 170 km. height. An excellent bibliography to references on anomalous propa- tion of sound in the atmosphere is included. *Subject Headings:* **Anomalous sound propagation, udibility zones, Upper air temperatures.**—*M.R.*

1950

J–108 551.596.1:551.557:551.524.7

Crary, A. P., **Investigation of stratosphere winds and temperatures from acoustical propagation udies.** *U. S. Air Force, Cambridge Research Laboratories, Geophysical Research Papers*, No. 5, ne **1950.** 32 p. 21 figs., 7 tables, 12 refs. **MH-BH**—Investigation of velocities of compressional aves at 30 to 60 km. height made by sound propagation tests, and knowledge obtained of strato- here winds and temperatures. Separation of temperature and wind effects is made possible by ariations in the distances and azimuths of the recording sites from the source of the waves. Results summer tests in Canal Zone, Bermuda, and Alaska, and of winter test in Alaska, and results of complete tests on east coast of U. S. and in New Mexico, are presented. Temperatures found less han those reported in earlier acoustical studies where winds were assumed to be negligible. *From*

author's abstract. Easterly winds found during summer months for all latitudes, with minimu values in Alaska; high westerly winds found in Alaska in winter. Diurnal effects shown negligibl Paper summarizes work up to Aug. 1949, by the Terrestrial Sciences Laboratory of the Geophysic Research Directorate on investigation of stratospheric wind and temperature from acoustic sources. Main features of other reports are included. *Subject Headings:* **Acoutical soundin Anomalous sound propagation, Upper air winds, Upper air temperatures.**

J–109 551.543.3:530.145.

Scorer, R. S., **Numerical evaluation of integrals of the form** $I = \int_{x1}^{x2} f(x) e^{i\phi(x)} dx$ **and the tabulatio of the function** $Gi(z) = (1/\pi) \int_0^\infty \sin(uz + \frac{1}{3}u^3) du$. *Quarterly Journal of Mechanics and Applied Math matics*, 3(1):107–112, March 1950. 4 refs., 4 equations. **DLC**—Highly theoretical developmen of equations for calculating wave form in a dispersive medium. *Subject Headings:* **Wave form Wave mechanics.**

J–110 551.596.1:551.543:53

Scorer, R. S., **The dispersion of a pressure pulse in the atmosphere.** *Royal Society of Londo Proceedings, Ser. A*, 201(1064):137–157, March 7, 1950. 13 figs., 2 tables, 16 refs., 55 equation **DLC**—The amplitude and form of a pressure oscillation, as related to the magnitude of and distan from a great explosion, are derived. Solution is compared with actual observations made at varyin distances from the Great Siberian Meteorite, 1908, and the Krakatoa eruption, 1883. *Subje Headings:* **Acoustical phenomena, Pressure oscillations, Great Siberian Meteor (1908), Krakat eruption (1883).**

J–111 551.596.1:551.511:551.541:53

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PART III. METEOROLOGICAL ARTICLES APPEARING IN RECENTLY ISSUED PUBLICATIONS

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